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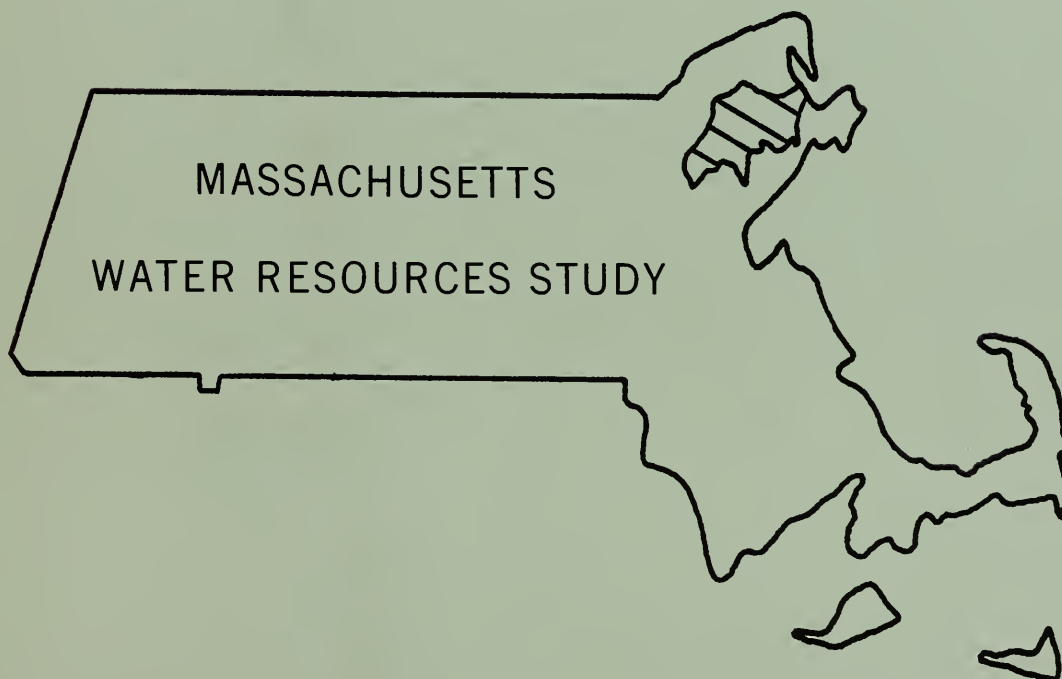
UNITED STATES DEPARTMENT of AGRICULTURE

# INVENTORY

of

## POTENTIAL and EXISTING UPSTREAM RESERVOIR SITES

IPSWICH STUDY AREA



U.S. DEPARTMENT of AGRICULTURE  
Soil Conservation Service  
Economic Research Service  
Forest Service

In cooperation with the

MASSACHUSETTS WATER RESOURCES COMMISSION

JUNE 1974

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# FOREWORD

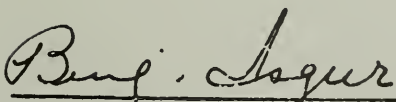
The United States Department of Agriculture, in cooperation with the Massachusetts Water Resources Commission, is participating in the Massachusetts Water Resources Study of the water and related land resources of the Commonwealth. One phase of the study is the inventorying of potential and existing upstream reservoir sites.

The Commonwealth of Massachusetts, through the Water Resources Commission, provides guidance and significant financial contribution toward this phase of the Massachusetts Water Resources Study. The Massachusetts Water Resources Commission, to fulfill its responsibilities under Chapter 620, Acts of 1956 and Chapter 767, Acts of 1970, requires technical and engineering data and information on potential upstream reservoir sites. The Department of Agriculture is participating in this study under the provisions of Section 6 of the Watershed Protection and Flood Prevention Act (Public Law-566, 83rd Congress, as amended) which authorizes the Secretary of Agriculture to cooperate with other federal, state and local agencies, in surveys and investigations of the watersheds of rivers and other waterways as a basis for the development of coordinated programs.

This report, prepared by the Soil Conservation Service and submitted by the USDA Field Advisory Committee to the Water Resources Commission, identifies and inventories potential and existing upstream reservoir sites within the Ipswich Study Area.

The Massachusetts Water Resources Commission will use this report, together with other reports and studies prepared by the United States Department of Agriculture and others, in the preparation of a comprehensive plan for the Commonwealth's water and land resources.

The information and data contained herein will also assist local, state and federal agencies in their specific planning activities for the coordinated and orderly conservation, development, utilization and management of the water and land resources to meet the rapidly expanding needs.



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Division of Water Pollution Control  
Massachusetts Water Resources Commission

Valuable assistance was provided by Division of Water Resources personnel, whose intimate knowledge of water resources utilization and potential was most helpful.

Soil Conservation Service personnel prepared this report. Richard L. Pratt was responsible for the development of the engineering phases. Lawrence N. Boutiette and Clark R. Bordeaux collected and processed basic site data. Donald E. Mills reported on geologic conditions. Kathy Gastinger typed the manuscript. Jim Wesoloski was responsible for editing and publication.

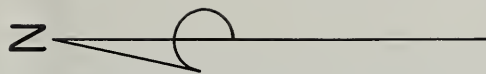
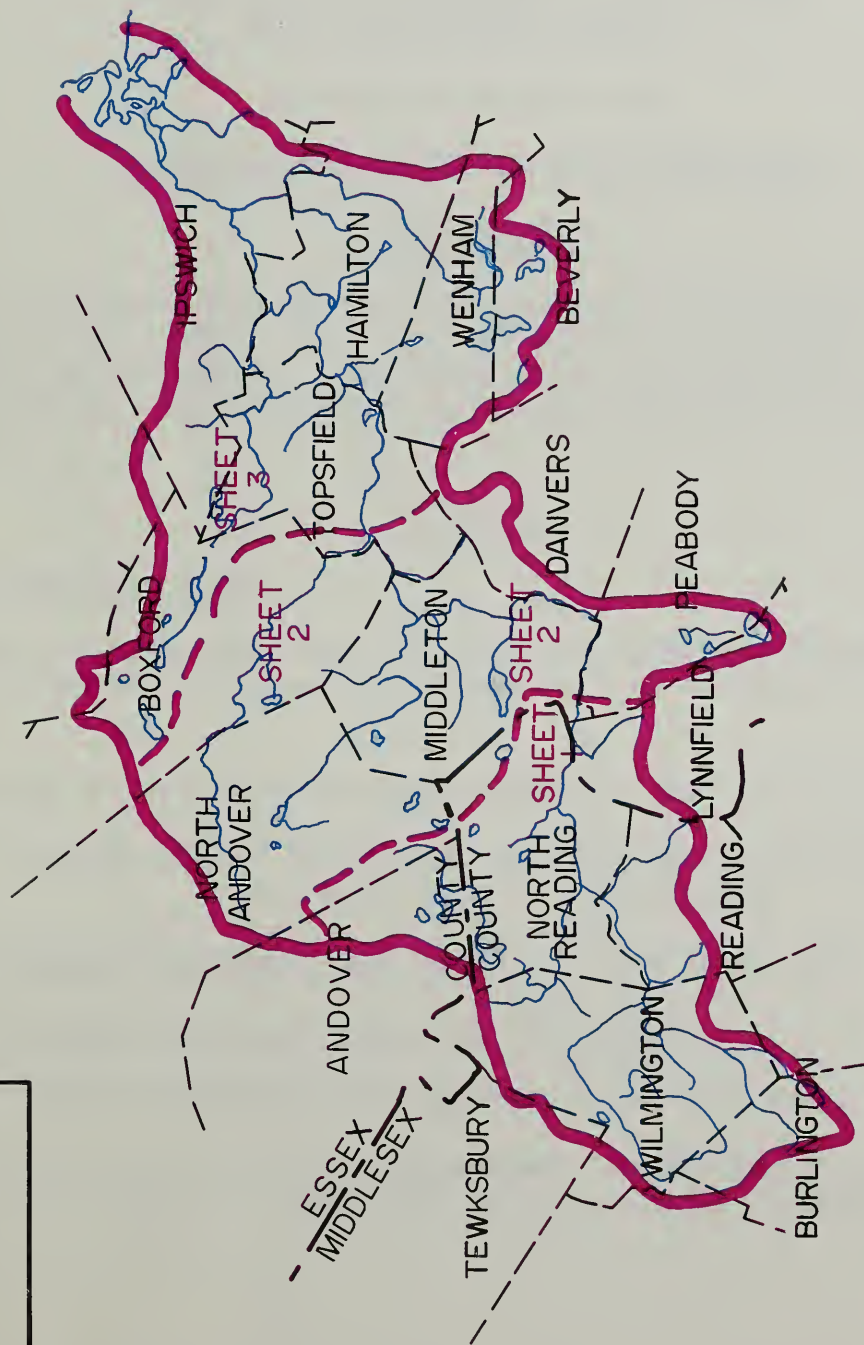
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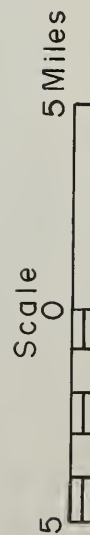




# LEGEND

— STUDY AREA BOUNDARY

SHEET 1  
SHEET 2



## LOCATION of SUB-WATERSHED IPSWICH STUDY AREA

MASSACHUSETTS





INVENTORY OF  
POTENTIAL AND EXISTING UPSTREAM RESERVOIR SITES

in the  
IPSWICH STUDY AREA

prepared by the  
UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

in cooperation with the  
MASSACHUSETTS WATER RESOURCES COMMISSION

INTRODUCTION

This report presents data on sixty-one potential and twenty-eight existing reservoirs in the Ipswich Study Area in Essex and Middlesex Counties in northeastern Massachusetts. The Study Area covers about 100,000 acres or 156 square miles. Portions of 21 cities and towns are located within the study area.

CRITERIA

Potential Reservoir Sites

The primary considerations used to identify potential reservoir sites were suitable topography for a dam and reservoir, and a relatively undeveloped pool area.

The following criteria were used as a guide in site selection:

1. Drainage area - larger than one-half square mile, but not greater than 50 square miles.
2. Minimum beneficial pool depth - 7 feet at the dam.
3. Minimum beneficial pool area - 10 acres.
4. Minimum beneficial pool capacity - 100 acre feet.
5. Pool area relatively undeveloped - no housing developments, industrial areas, or major highways inundated.



In 1965, the Soil Conservation Service prepared an inventory of the more obvious potential reservoir sites in the Ipswich River Watershed. The study, which was financed by the Massachusetts Water Resources Commission, located 35 sites. A supplementary Study located an additional 27 sites. Thirty of the sites do not meet the criteria for this Inventory because of small drainage area, small volume of storage, or development within the area affected by a potential reservoir. These original sites are included in this report with, where applicable, a statement as to why they do not meet present study criteria.

Sites in the 1965 studies were identified by numbers ranging from 1 to 61 (site 1A was located within the pool area of site 1). The "Inventory of Potential and Existing Upstream Reservoir Sites" utilized a 4-digit number such as 0401 to identify sites. The first two digits indicate that the site is in subwatershed Ipswich 04, the second two digits indicate a particular site within the subwatershed. Sites 0401 through 0461 correspond to sites 1 through 61 in the 1965 studies.

Many of the communities in the Ipswich River Watershed utilize off-stream pumped storage reservoirs as part of their water supply system. Water is pumped to the reservoir from a source located outside the reservoir drainage area. Because of the interest in pumped storage, two criteria which are normally required in these "Inventories of Potential and Existing Reservoir Sites" were waived. Ordinarily, the maximum beneficial storage is limited to a volume equal to 25 inches of runoff from the site drainage area. This criteria limits the structure designs to a maximum beneficial pool which contains a volume about equal to the average annual runoff expected from the site drainage area. The second criteria limits the maximum beneficial pool surface area to one-tenth of the site drainage area size. This criteria limits the surface area so that summer evaporation losses, which are directly related to surface area, do not become excessive in relation to the inflow from the drainage area. Both of the criteria are dependent on the site drainage area and are not significant if a substantial volume of water is being pumped into the reservoir from outside the drainage area.

#### Existing Reservoirs

Existing reservoirs were located using the U.S. Geological Survey (USGS) quadrangle sheets and field observation. Two criteria were used to determine sites to be included in this report:

1. Surface area -- at least 10 surface acres or a pond of less than 10 acres, identified by name on the USGS topographic map.
2. Man-made dam -- the pool must be the result of dam construction. Natural ponds and beaver dams are not included.

## INVESTIGATIONS AND ANALYSES

### Potential Reservoir Sites

Sites were located using the latest available USGS 7½ minute quadrangle sheets. Natural basins, or topography favorable for storage of water, and a suitable area for a dam were the primary considerations in the initial site selection. Watershed boundaries were delineated on the quadrangle sheets and the drainage area was determined for each initial site selected. Water storage areas available upstream of the site centerline were measured. Data were also obtained to calculate the volume of earth fill required for the dam and any supplementary dikes that might be needed to contain a reservoir.

The sites selected are in essentially the same location as those located in the earlier SCS studies. In some cases, locations were shifted slightly to take better advantage of topography or to avoid recent development in the area.

At each site a field reconnaissance was made that included an inventory of land and facilities (man-made structures) that would be affected if a dam and reservoir were developed at the site. If it was determined that the reservoir would flood extensive man-made facilities, or a study of available data showed that the site did not meet criteria for the study, the site was dropped from further consideration.

A surficial geologic investigation was made of each potential site to determine any obvious geologic conditions that might affect the site's water-holding capability or require extensive foundation preparation. A preliminary geological report was prepared which outlined the types of materials that might be expected at the site and their effect on construction costs and waterholding capabilities for the site. The report of geologic conditions was based on the geologist's interpretation following the surficial investigation of the site and the surrounding area. No borings were made at any site and subsurface conditions may vary from those indicated in this report.

Hydrologic and hydraulic data were calculated using methods developed by the Soil Conservation Service. Rainfall data were obtained from Technical Paper 40 and 49, U.S. Department of Commerce, Weather Bureau. Preliminary structure site analyses for several levels of development for each site were processed by computer, using a program which determines the most economical type of principal spillway; determines the runoff and peak flow for the 100-year frequency, 10-day duration principal spillway design storm; routes the design storm to set the emergency spillway crest; performs other routings to determine the design high water and top of dam elevations; calculates embankment yardage and other construction quantities; determines the total estimated cost of the reservoir; and calculates "safe yield" for water supply purposes.

### Existing Reservoirs

An inventory was made of twenty-eight existing reservoirs that cover at least ten acres or are identified by name on the USGS quadrangle sheet, and are formed



by a man-made dam. An engineer made a field reconnaissance to determine the physical condition of each structure and to assess the potential for expansion of the reservoir. While at the site, photographs were taken. Selected photographs are included in this report. Ownership and use information for the reservoirs was obtained from records of the Massachusetts Department of Public Works and from local interviews.

### COSTS

Comparative cost estimates for potential reservoir sites were based on costs and land values as of 1972. The estimates include: (1) construction costs; (2) contingencies; (3) engineering and administrative services necessary for surveys, geology, final design, and construction inspection; (4) cost for land required for the reservoir, dam and spillway; and (5) costs associated with the purchase or relocation of man-made facilities affected by the constructed reservoir.

Construction costs were based on recent dam construction contract costs in Massachusetts. A factor for contingencies, equal to 15 percent to 35 percent of the construction cost, was included to account for items that were not considered at this intensity of study. Engineering and administrative services ranged from 20 percent to 40 percent of the construction cost.

Costs for land acquisition were based on an evaluation of current real estate transactions and market conditions. Land with potential for development was valued at from \$1,000 to \$10,000 per acre; land with little development potential was valued at from \$500 to \$800 per acre. Land values also varied from site to site based on the proximity to developed areas and highways, development taking place in the area, and suitability for development. Land needed for the dam, spillway and design high water pool was included in the land acquisition cost.

Cost estimates are presented on the basis of a cost per acre-foot of storage and cost per surface acre to provide a comparison between different sites and different levels of development at the same site. Costs are based on preliminary estimates; firm cost estimates for any site can be determined only after completion of detailed geological and engineering investigations, final structural designs, and land appraisals.

No cost estimates are included for existing reservoirs.

### REPORT FORMAT

The location map, placed after the Table of Contents, outlines the area covered by the study. To aid local residents in determining which sites are located in their city or town, the Municipal Index of Sites lists the site identification numbers for potential and existing reservoir sites within each municipality and the page number of this report on which data are recorded.

The Site Data section provides information for the potential and existing reservoir sites which are included in this report.

## Potential Reservoir Sites

These site data include a Location paragraph which contains a narrative description of the location of the site in reference to nearby roads, railroads, or other physical landmarks. In addition, the latitude, longitude and USGS quadrangle sheet name are provided to enable more accurate location.

Man-made facilities that would be flooded by a reservoir at the potential site are presented in the Facilities Affected paragraph. The elevation of existing facilities was estimated during the engineer's field reconnaissance with the aid of the USGS quadrangle sheets.

A summary of the preliminary geologic report is contained in the Geologic Conditions paragraph. The material in the abutments (the valley sides) and the foundation (the valley floor) is described. An estimate is made of the depth to bedrock and the probable type of rock. The availability of fill material which would be used in the dam construction is noted.

Possible leakage problems are indicated and the waterholding capability of the site is subjectively described as "good," "fair," or "poor." The waterholding capability statement is based on the geologist's interpretation of the surficial conditions he has observed during the field reconnaissance.

Engineering Notes provide information which should be helpful in preliminary design of a dam. One of the abutments is recommended as the location for an excavated emergency spillway. The excavated spillway might be in earth or rock cut -- depending upon the depth to bedrock in the abutment. If an excavated emergency spillway is unable to carry the required flows at safe velocity, the need for a concrete emergency spillway is noted. If waterholding capability can be significantly improved with a practical cutoff through pervious abutment or foundation material, this fact is also noted.

When it is known that some portion of a reservoir site is located on land owned by a governmental or quasi-public unit, the information is presented in a Public Ownership paragraph.

Sites which meet study criteria have been analyzed using a computer program which develops structure site analyses for several levels of beneficial pool. Results of the computer program are presented in the tables entitled Summary Data for Potential Upstream Reservoir Sites at the end of each subwatershed section. Two information lines contain data on site drainage area, USGS quadrangle name on which the site is located, latitude and longitude of the site, site rating, stream water quality and principal spillway design storm runoff and peak flow. The site rating is based on geologic conditions and the expected waterholding capability. Sites are given one of the following ratings:

- "1.": Suitable for deep permanent storage (over 10 feet in depth).
- "2.": Best suited for shallow water storage (3 to 5 foot maximum depth).
- "3.": Best suited for temporary storage (e.g., floodwater and sediment storage).



In order to furnish the most data for each potential reservoir site, each site was considered to be suitable for deep permanent storage (rating "1") for purposes of structure site analyses. The rating for any site could change based on detailed geologic investigations.

Stream water quality ratings are based on classifications assigned by the Division of Water Pollution Control, Massachusetts Water Resources Commission, and published in Water Quality Standard, June 1967 and are as follows:

- "Class A -- Waters designated for use as public water supply in accordance with Chapter 111 of the General Laws. Character uniformly excellent.
- Class B -- Suitable for bathing and recreational purpose including water contact sports. Acceptable for public water supply with appropriate treatment.  
Suitable for agricultural, and certain industrial cooling and process uses; excellent fish and wildlife habitat; excellent aesthetic value.
- Class C -- Suitable for recreational boating; habitat for wildlife and common food and game fishes indigenous to the region; certain industrial cooling and process uses; under some conditions acceptable for public water supply with appropriate treatment.  
Suitable for irrigation of crops used for consumption after cooking. Good aesthetic value.
- Class D -- Suitable for aesthetic enjoyment, power, navigation, and certain industrial cooling and process uses. Class 'D' waters will be assigned only where a higher water use class cannot be attained after all appropriate waste treatment methods are utilized."

The Summary Data for Potential Upstream Reservoir Sites tables also contain data for as many as six possible levels of development at each site. Elevations of the beneficial pool, emergency spillway crest, design high water, and top of dam are shown along with pertinent storage volumes, surface areas and depths. Comparative cost expressed in dollars per acre foot of storage and dollars per surface acre are provided to aid in comparison of levels of development. The emergency spillway type which was used in the structure site analyses is indicated by an emergency spillway type code explained in the table notes.

These tables are photo-reductions of the computer output sheets. Elevations are shown to the tenth of a foot and costs to the nearest \$10, but are not to be considered that accurate because of the limited investigations made with preliminary data. All the Summary Data Tables are based on preliminary reconnaissance - type investigations and computer-produced structure site analyses. Additional detailed engineering, geologic and design investigations must be made before final site selection, land acquisition and final design would be practical.

Estimated safe yields for each potential reservoir are also shown on the tables and were based on information extrapolated from data developed by Professor G. R. Higgins, Civil Engineering Department, University of Massachusetts. These estimated safe yields are based on a 95 percent chance, or the minimum yield that could be expected 19 years out of 20 -- taking into consideration reservoir storage-volume and expected runoff. These data do not consider evaporation, seepage, or prior upstream usage losses.

The Committee on Rainfall and Yield of Drainage Areas of the New England Water Works Association has recommended a figure of 600,000 gallons per day per square mile as a maximum economically feasible safe yield. Data for some of the potential sites in this report show a safe yield above 600,000 gallons per square mile per day; these higher values are useful to define the upper portion of a discharge-storage curve for preliminary analysis. For detailed evaluation of a potential site for water supply purposes, the recommendation of the New England Water Works Association should be considered.

As noted in the section outlining criteria for this study, no attempt was made to limit the volume or surface area of a potential reservoir because of a small drainage area. This was done to present information on levels of development that might be suitable as pumped storage sites for municipal water supply. The safe yield indicated on the Summary Data Tables is based entirely on the volume of storage and the site drainage area. If the site were used for pumped storage, the safe yield would be increased, depending on the pumping rate and yield of the source being pumped.

#### Existing Reservoirs

Site data for existing reservoir sites are presented in a different format from the potential reservoir site data:

Location is indicated by reference to nearby roads, railroads or other physical landmarks. The appropriate USGS quadrangle sheet is indicated.

Physical data (surface area, height of dam, and drainage area) were estimated from the quadrangle sheet and by field reconnaissance.

Potential for Expansion of the existing reservoir is estimated and any major man-made facilities which would be affected by an enlarged reservoir are noted. In some instances, increasing the surface area of an existing reservoir may result in evaporation losses which can not be compensated for by inflow from the drainage area. Because of the interest in pumped storage municipal water supply sites in the Ipswich study area, these situations are indicated by the statement, "Expansion would appear to require diversion of water from outside the site drainage area."

A description of the dam and spillway system is included in the Remarks paragraph. Construction materials, spillway type and size, and condition of the structures are noted.



Ownership and Use of the reservoir is indicated, if available.

Some existing reservoirs that did not meet the study criteria (10-acre minimum surface area and a man-made dam) have been included in the report to present the information that was obtained.

### MAPS

Three maps depicting portions of the Ipswich Study Area appear after the Summary Data Tables. The maps are reductions of mosaics prepared from 7½ minute USGS quadrangle sheets. The quadrangle sheets used and published dates are listed on the report maps.

Potential sites that met study criteria are indicated with a red rectangle surrounding the site number. The maximum beneficial pool (from the Summary Data for Potential Upstream Reservoir Sites Table) is indicated by a blue large-wave pattern. Potential sites identified in the 1965 SCS studies which do not meet the criteria for this Inventory are indicated with a red dashed-rectangle surrounding the site number.

Existing reservoir sites are identified by a red circle surrounding the site number and a blue small-wave pattern over the existing surface area.

SITE DATA  
FOR  
IPSWICH STUDY AREA

The Ipswich River Study Area covers about 100,000 acres in Andover, Beverly, Boxford, Danvers, Georgetown, Hamilton, Ipswich, Lynnfield, Middleton, North Andover, Peabody, Rowley, Topsfield, and Wenham in Essex County and Billerica, Burlington, North Reading, Reading, Tewksbury, Wilmington, and Woburn in Middlesex County. The river originates in Burlington and flows northeasterly to the Atlantic Ocean off the coast of Ipswich, passing through, or forming the boundary for, Wilmington, Reading, North Reading, Lynnfield, Middleton, Peabody, Danvers, Boxford, Topsfield, Wenham, and Hamilton.

Geology of the Study Area is characterized by granite or gneiss bedrock overlain by outwash sand and gravel or glacial till. Bedrock is near the ground surface in many areas.

Sixty-one potential reservoir sites and twenty-eight existing reservoirs were studied.

\*\*\*\*\*

POTENTIAL SITE IP-0401

Location: On the Ipswich River about 700 feet upstream from Burlington Avenue, Route 62 in Wilmington, Mass.

Wilmington, Mass. USGS quadrangle

Latitude: 42°32'25"      Longitude: 71°11'02"  
Map Sheet 1

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed" prepared by the Soil Conservation Service, Jan. 1965. This site does not meet the criteria for this inventory.

No further investigations were made. The left abutment is now a housing development. The upper potential pool area is also developed with many streets and houses. The majority of the drainage area has also been developed.

\*\*\*\*\*

POTENTIAL SITE IP-0402

Location: On an unnamed tributary to Maple Meadow Brook about 1500 feet upstream from Chestnut Street in Wilmington, Mass.

Wilmington, Mass. USGS quadrangle

Latitude:  $42^{\circ}31'38''$  Longitude:  $71^{\circ}10'41''$   
Map Sheet 1

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. This site does not meet the criteria for this inventory.

No further investigations were made. The right abutment is now a golf course. Beneficial storage for the site was only 80 acre-feet.

\*\*\*\*\*

POTENTIAL SITE IP-0403

Location: On Maple Meadow Brook at Middlesex Canal Crossing about 1,000 feet upstream from the Boston and Maine Railroad in Wilmington, Mass.

Wilmington, Mass. USGS quadrangle

Latitude:  $42^{\circ}31'59''$  Longitude:  $71^{\circ}09'48''$   
Map Sheet 1

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. This site does not meet the criteria for this inventory.

No further investigations were made. The potential pool area is now being used as a water-supply well field.

\*\*\*\*\*

POTENTIAL SITE IP-0404

Location: On Lubber Brook about 1,100 feet upstream from Shawsheen Avenue in  
Wilmington, Mass.

Wilmington, Mass. USGS quadrangle

Latitude:  $42^{\circ}33'21''$  Longitude:  $71^{\circ}11'59''$   
Map Sheet 1

This site was included in the "Study of Possible Storage Sites for  
the Ipswich River Watershed," prepared by the Soil Conservation  
Service, January, 1965. The site does not meet the criteria for  
this inventory.

No further investigations were made. The upper portion of the  
potential pool area is now lined with houses.

\*\*\*\*\*

POTENTIAL SITE IP-0405

Location: On Bear Meadow Brook about 200 feet upstream from Haverhill  
Street in Reading, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}33'27''$  Longitude:  $71^{\circ}05'35''$   
Map Sheet 1

This site was included in the "Study of Possible Storage Sites for  
the Ipswich River Watershed," prepared by the Soil Conservation  
Service, January, 1965. The site does not meet the criteria for  
this inventory.

No further investigations were made. The site would require an  
8,000 foot long dam which would be built on deep organic soils.

\*\*\*\*\*



POTENTIAL SITE IP-0406

Location: On Skug River about 650 feet upstream from Central Street in North Reading, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}35'56''$  Longitude:  $71^{\circ}06'30''$   
Map Sheet 1

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. The site does not meet the criteria for this study.

No further investigations were made. The potential flood pool area and much of the potential beneficial pool area is now devoted to housing.

\*\*\*\*\*

POTENTIAL SITE IP-0407

Location: On an unnamed tributary to Martins Brook about 900 feet upstream from Main Street (Route 28) in North Reading, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}34'51''$  Longitude:  $71^{\circ}06'35''$   
Map Sheet 1

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January 1965. The site does not meet the criteria for this study.

No further investigations were made. The drainage area is only 0.22 square miles. Beneficial storage for the site was only 70 acre-feet.

\*\*\*\*\*



POTENTIAL SITE IP-0408

Location: On an unnamed tributary to Martins Brook about 900 feet upstream from Winter Street (Route 62) in North Reading, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}34'31''$  Longitude:  $71^{\circ}06'10''$

Map Sheet 1

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. The site does not meet the criteria for this inventory.

No further investigations were made. The drainage area is only 0.27 square miles. Beneficial storage for the site was only 130 acre-feet.

\*\*\*\*\*

POTENTIAL SITE IP-0409

Location: On Maple Meadow Brook about 100 feet upstream from Federal Street in Wilmington, Mass.

Wilmington, Mass. USGS quadrangle

Latitude:  $42^{\circ}33'06''$  Longitude:  $71^{\circ}09'03''$

Map Sheet 1

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. The site does not meet the criteria for this inventory.

No further investigations were made. The site was originally studied as a single-purpose flood control structure. The flood pool is now lined with houses.

\*\*\*\*\*

POTENTIAL SITE IP-0410

Location: On Wills Brook at the old railroad grade in Lynnfield, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}34'14''$  Longitude:  $71^{\circ}02'56''$

Map Sheet 1

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. The site will be used by the Lynnfield Center Water District as a water supply reservoir.

\*\*\*\*\*

POTENTIAL SITE IP-0411

Location: At the outlet of the Strawberry Meadow Marsh about 200 feet northeast of Lindor Road in North Reading, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}35'10''$  Longitude:  $71^{\circ}04'18''$

Map Sheet 1

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	Powerlines	80

POTENTIAL SITE IP-0411 (continued)

Geologic Conditions: Both abutments are thin outwash sand and gravel deposits with granitic bedrock outcrops. Depth to bedrock in the foundation is estimated to be from 20 to 30 feet. Waterholding capabilities appear to be fair. There may be leakage through the foundation. Borrow material for dam construction was not located near the site.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock. Waterholding capabilities may be improved if a cut-off to bedrock can be made. The site was investigated by Camp, Dresser, and McKee, consulting engineers for the Town of North Reading.

Public Ownership: Above elevation 90, about 20% of the pool area is owned by the Massachusetts Department of Natural Resources, Division of Forests and Parks.

\*\*\*\*\*

POTENTIAL SITE IP-0412

Location: On an unnamed tributary to the Ipswich River about 1500 feet upstream from North Main Street (Route 114) in Middleton, Mass.

Reading, Mass. USGS quadrangle

Latitude: 42°36'12" Longitude: 71°02'06"

Map Sheet 2

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	3 houses	100
	Route 114	85
	Power lines	85

Geologic Conditions: Both abutments are thin beds of outwash sand and gravel with granite bedrock outcrops. Depth to bedrock in the foundation is estimated to be from 10 to 15 feet. Waterholding capabilities appear to be good if cutoff is made to bedrock. Pervious material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

\*\*\*\*\*

POTENTIAL SITE IP-0413

Location: On an unnamed tributary to the Ipswich River about 700 feet upstream from Liberty Street in Middleton, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}36'32''$  Longitude:  $71^{\circ}00'33''$

Map Sheet 2

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	4 houses	80
	Pumping station	80
	Route 62	80
	Road	80
	Power lines	80
	Road	75
	Route 114	75
	School Street	75
	Boy Scout Club Building	75
	Church Hall	75
	Barn	75
	20 houses	75

Geologic Conditions: Both abutments are thin discontinuous deposits of glacial till underlain by granitic bedrock. Depth to bedrock in the foundation is estimated to be from 5 to 10 feet. Boulders in the stream channel may be bedrock. Waterholding capabilities appear to be good. Borrow material for dam construction was located near the site.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

Public Ownership: About 5% of the potential pool area is owned by the Town of Middleton, Mass.

\*\*\*\*\*



POTENTIAL SITE IP-0414

Location: On Boston Brook about 5200 feet upstream from the intersection of Salem Street and Campbell Road in North Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}39'06''$  Longitude:  $71^{\circ}04'06''$   
Map Sheet 2

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	2 houses	130
	3 barns	130
	Saw mill	130
	Salem Street	125

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock in the foundation is estimated to be from 30 to 40 feet. Waterholding capabilities appear to be fair. Leakage is expected through the abutments and the foundation. Pervious material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The right abutment is recommended for the excavated emergency spillway location. Waterholding capabilities may be improved if a cut-off to impervious material can be made.

Public Ownership: About 20% of the potential pool area is owned by the Massachusetts Department of Natural Resources, Division of Forests and Parks.

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POTENTIAL SITE IP-0415

Location: On Boston Brook about 100 feet upstream from the North Andover-Middleton town line in North Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}37'59''$  Longitude:  $71^{\circ}02'35''$   
Map Sheet 2

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	4 houses	120
	5 houses	115
	5 houses	110
	3 houses	105
	Barn	105
	House	100
	Power lines	100
	Salem Street	100
	Campbell Road	100
	Ingalls Street	100
	Forest Street	100

POTENTIAL SITE IP-0415 (continued)

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock in the foundation is estimated to be from 25 to 35 feet. Waterholding capabilities appear to be poor. Leakage is expected through both abutments and the foundation. Pervious material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The left abutment is recommended for the excavated emergency spillway location.

Public Ownership: About 10% of the potential pool area is owned by the Massachusetts Department of Natural Resources, Division of Forests and Parks.

\*\*\*\*\*

POTENTIAL SITE IP-0416

Location: On an unnamed tributary to Boston Brook about 2600 feet downstream from Pout Pond in Middleton, Mass.

South Groveland, Mass. USGS quadrangle

Latitude: 42°37'50" Longitude: 71°01'25"

Map Sheet 2

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	Liberty Street	110

Geologic Conditions: Both abutments are englacial drift, sand, gravel, and boulders underlain by granite bedrock. Depth to bedrock in the foundation is estimated to be from 5 to 10 feet. Waterholding capabilities appear to be good if cutoff is made to bedrock. Borrow material for dam construction was located near the site.

Engineering Notes: The left abutment is recommended for the emergency spillway location, the spillway will probably be excavated in bedrock.

Public Ownership: About 50% of the potential pool area is owned by the Massachusetts Department of Natural Resources, Division of Forests and Parks.

\*\*\*\*\*

POTENTIAL SITE IP-0417

Location: On Boston Brook about 1,100 feet upstream from Peabody Street in Middleton, Mass.

Reading, Mass. USGS quadrangle

Latitude: 42°37'03" Longitude: 71°00'30"

Map Sheet 2

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	6 houses	80
	Barn	80
	Essex Street	80
	School Street	80
	2 houses	75
	2 barns	65
	3 houses	60
	Liberty Street	60

Geologic Conditions: Both abutments are thin deposits of cobbly gravel with bedrock outcrops. Depth to bedrock in the foundation is estimated to be from 25 to 30 feet. Waterholding capabilities appear to be good if cutoff is made to bedrock in the abutments. Borrow material for dam construction was not located near the site.

Engineering Notes: The right abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

\*\*\*\*\*

POTENTIAL SITE IP-0418

Location: On an unnamed tributary to the Ipswich River about 500 feet upstream from River Street in Middleton, Mass.

Reading, Mass. USGS quadrangle

Latitude: 42°34'18" Longitude: 71°00'28"

Map Sheet 2

Facilities Affected: None below elevation 80.

Geologic Conditions: Both abutments are glacial till. Depth to bedrock in the foundation is estimated to be from 20 to 30 feet. Waterholding capabilities appear to be good. Borrow material for dam construction was located near the site.



POTENTIAL SITE IP-0418 (continued)

Engineering Notes: The right abutment is recommended for the excavated emergency spillway location.

Public Ownership: About 5% of the potential pool area is owned by the Town of Middleton, Mass.

\*\*\*\*\*

POTENTIAL SITE IP-0419

Location: On Mosquito Brook at Rea Street in North Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}39'59''$  Longitude:  $71^{\circ}05'21''$

Map Sheet 2

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	3 houses	190
	Summer Street	190
	Rea Street	190

Geologic Conditions: Both abutments are glacial till. Depth to bedrock in the foundation is estimated to be from 15 to 20 feet. Waterholding capabilities appear to be good. Borrow material for dam construction was located near the site.

Engineering Notes: The right abutment is recommended for the excavated emergency spillway location.

\*\*\*\*\*

POTENTIAL SITE IP-0420

Location: On Mosquito Brook about 1100 feet upstream from Foster Street in North Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude: 42°40'15" Longitude: 71°04'07"  
Map Sheet 2

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	House	150
	Barn	150
	Shed	150
	Salem Street	150
	Foster Street	150
	9 houses	145
	2 houses	140

Geologic Conditions: Both abutments are thin discontinuous deposits of outwash sand and gravel with outcrops of granite bedrock. Depth to bedrock in the foundation is estimated to be from 30 to 40 feet. Waterholding capabilities appear to be fair if cutoff is made to bedrock in the abutments. Leakage is expected through the foundation. Pervious borrow material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The right abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

Public Ownership: About 5% of the potential pool area is owned by the Federal Government.

\*\*\*\*\*

POTENTIAL SITE IP-0421

Location: On Fish Brook about 1900 feet upstream from Brookview Road in Boxford, Mass. The reservoir is mostly in North Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude: 42°39'44" Longitude: 71°02'04"  
Map Sheet 2

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	2 houses	120
	Greenhouse	120
	Sportsman's Club	120
	Boxford Street	120
	Lacy Street	120
	Powerlines	120

POTENTIAL SITE IP-0421 (continued)

Geologic Conditions: Both abutments are englacial drift. Depth to bedrock in the foundation is estimated to be from 10 to 15 feet. Waterholding capabilities appear to be good. Pervious material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

\*\*\*\*\*

POTENTIAL SITE IP-0422

Location: On an unnamed tributary of Fish Brook about 200 feet upstream from Fish Brook in Boxford, Mass. The site is south of Fish Brook and west of Middleton Street.

South Groveland, Mass. USGS quadrangle

Latitude: 42° 39' 27" Longitude: 71° 00' 50"

Map Sheet 2

Facilities Affected: None below elevation 110.

Geologic Conditions: Both abutments are englacial drift with many large boulders and possibly outcrops of granite bedrock. Depth to bedrock in the foundation is estimated to be from 15 to 25 feet. Waterholding capabilities appear to be fair. Leakage is expected through both abutments and the foundation. Borrow material for dam construction was located near the site. Some impervious material may be needed from off-site.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock. Waterholding capabilities may be improved if a cutoff to bedrock can be made.

\*\*\*\*\*



POTENTIAL SITE IP-0423

Location: On Fish Brook about 250 feet upstream from Lockwood Lane in Boxford, Mass.

Georgetown, Mass. USGS quadrangle

Latitude: 42°38'43" Longitude: 70°59'24"

Map Sheet 2

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	House	80
	Topsfield Road	80
	2 houses	75
	Cottage	75
	Mill Street	75

Geologic Conditions: Both abutments are glacial drift or outwash sand and gravel with cobbles and boulders. Depth to bedrock in the foundation is estimated to be from 15 to 20 feet. Waterholding capabilities appear to be good. Borrow material for dam construction was located near the site. Impervious material may be needed from off-site.

Engineering Notes: The right abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock. The 4.8 square mile drainage area indicated in the Summary Data Table is in error. The correct figures are 18.24 square miles or 11,700 acres.

Public Ownership: About 25% of the potential pool area is owned by the Town of Boxford, Mass.

\*\*\*\*\*

POTENTIAL SITE IP-0424

Location: On Nichols Brook about 4000 feet upstream from the Ipswich River in Middletown and Topsfield, Mass. Half of the reservoir area is in each town.

Salem, Mass. USGS quadrangle

Latitude: 42°36'38" Longitude: 70°59'04"

Map Sheet 2

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January 1965. The site does not meet the criteria for this inventory.

No further investigations were made. Beneficial storage was only 200 acre-feet. A larger pool would affect Interstate Route 95, a golf course and local streets.

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POTENTIAL SITE IP-0425

Location: On Pye Brook about 100 feet upstream from Georgetown Road in Boxford, Mass.

Georgetown, Mass. USGS quadrangle

Latitude: 42°40'45" Longitude: 70°59'57"  
Map Sheet 3

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	2 houses	120
	Herrick Road	120
	2 houses	115

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock in the foundation is estimated to be from 20 to 25 feet. Waterholding capabilities appear to be fair. Leakage is expected through both abutments. Borrow material for dam construction was located near the site. Impervious material may be needed from off-site.

Engineering Notes: The left abutment is recommended for the excavated emergency spillway location. Waterholding capabilities may be improved if a cut-off to bedrock can be made.

\*\*\*\*\*

POTENTIAL SITE IP-0426

Location: On Pye Brook about 6,000 feet upstream from Haverhill Street (Route 97) and west of Hood Pond in Topsfield, Mass. Most of the reservoir area is in Boxford, Mass.

Georgetown, Mass. USGS quadrangle

Latitude: 42°40'05" Longitude: 70°58'00"  
Map Sheet 3

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. The site does not meet the criteria for this inventory.

No further investigations were made. A gravel pit operation has removed the left abutment. Interstate Route 95 and new houses are located in the upper portion of the potential pool area.

\*\*\*\*\*

POTENTIAL SITE IP-0427

Location: On an unnamed tributary to Hood Pond and Pye Brook about 600 feet downstream from the Rowley-Ipswich town line in Ipswich, Mass.

Georgetown, Mass. USGS quadrangle

Latitude:  $42^{\circ}40'48''$  Longitude:  $70^{\circ}56'39''$   
Map Sheet 3

The site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. The site does not meet the criteria for this inventory.

No further investigations were made. The drainage area is only 0.34 square miles. Beneficial storage for the site was only 50 acre-feet.

\*\*\*\*\*

POTENTIAL SITE IP-0428

Location: On Howlett Brook about 1,000 feet upstream from Route 1 in Topsfield, Mass.

Georgetown, Mass. USGS quadrangle

Latitude:  $42^{\circ}39'34''$  Longitude:  $70^{\circ}56'07''$   
Map Sheet 3

This site was included in the "Study of Possible Storage Sites for the Ipswich River Watershed," prepared by the Soil Conservation Service, January, 1965. The site does not meet criteria for this inventory.

No further investigations were made. The upper portion of the potential pool area has been developed.

\*\*\*\*\*

POTENTIAL SITE IP-0429

Location: On Howlett Brook about 600 feet upstream from Ipswich Road in  
Topsfield, Mass.

Georgetown, Mass. USGS quadrangle

Latitude: 42°39'22" Longitude: 70°55'09"  
Map Sheet 3

This site was included in the "Study of Possible Storage Sites for  
the Ipswich River Watershed," prepared by the Soil Conservation  
Service, January, 1965. The site does not meet criteria for this  
inventory.

No further investigations were made. The potential pool area  
has been developed.

\*\*\*\*\*

POTENTIAL SITE IP-0430

Location: On Gravelly Brook about 800 feet upstream from Topsfield Road in  
Ipswich, Mass.

Georgetown, Mass. USGS quadrangle

Latitude: 42°39'44" Longitude: 70°54'12"  
Map Sheet 3

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	Right Road	70

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock  
in the abutments may be shallow. Depth to bedrock in the  
foundation is estimated to be from 5 to 10 feet. Waterholding  
capabilities appear to be good if cutoff is made to bedrock.  
Borrow material for dam construction was located near the site.

POTENTIAL SITE IP-0430 (continued)

Engineering Notes: The right abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

Several previous engineering studies have suggested this general area for a possible pumped-storage water supply reservoir for Hamilton, Ipswich, Rowley, Topsfield, Wenham, Salem and Beverly.

Whitman and Howard, in a 1969 report (Ipswich River Watershed Project - Nos. 68-6 and FY 69-3 Surface Water Storage Sites) presented data on three alternatives (sites 30, 30A, and 30B) for the development of this area.

The dams for sites 30 and 30A were at the same location as site 0430. Site 30A utilized the same reservoir area; site 30 included an additional area in the headwaters of Bull Brook in the Parker River Watershed. Site 30B located directly east of site 0430 and the reservoir area is about 3/4 within the Parker River Watershed and 1/4 within the Ipswich Study Area.

Site 30B was further investigated in a 1973 report by Haley and Aldrich (Geotechnical Investigations and Feasibility Study of Reservoir Site 30B, Ipswich, Massachusetts).

Public Ownership: The entire site is within the Willowdale State Forest.

\*\*\*\*\*

POTENTIAL SITE IP-0431

Location: On an unnamed tributary to Black Brook about 600 feet upstream from Highland Street in Hamilton, Mass.

Georgetown, Mass. USGS quadrangle

Latitude: 42°38'23" Longitude: 70°53'17"  
Map Sheet 3

Facilities Affected:	Facility	Elevation
	Hamilton Road	50
	Barn	45
	Park road (gravel)	45



POTENTIAL SITE IP-0431 (continued)

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock in the abutments may be shallow. Depth to bedrock in the foundation is estimated to be from 10 to 15 feet. Waterholding capabilities appear to be good if cutoff is made to bedrock. Pervious borrow material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The right abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

Public Ownership: About 80% of the potential pool area is owned by the Massachusetts Department of Natural Resources, Division of Forests and Parks.

\*\*\*\*\*

POTENTIAL SITE IP-0432

Location: On Miles River at Sagamore Road in Hamilton and Ipswich, Mass. Half of the reservoir area is in each town.

Ipswich, Mass. USGS quadrangle

Latitude: 42°38'43" Longitude: 70°49'54"  
Map Sheet 3

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	Main Street	40
	Dodge Row	40
	Route 1A	40
	Cedar Street	40
	38 houses	40
	2 barns	40
	31 houses	35
	Sagamore Street	30
	Moulton Street	30
	Gardner Street	30
	Bridge Street	30
	Walnut Street	30
	Larch Row	30

Geologic Conditions: The right abutment is an esker with cobbles or sand and gravel. The left abutment is glacial till. Depth to bedrock in the foundation is estimated to be from 20 to 30 feet. Waterholding capabilities appear to be fair. Leakage is expected through the right abutment and possibly the foundation. Borrow material for dam construction was located near the site.

POTENTIAL SITE IP-0432 (continued)

Engineering Notes: Preliminary geologic investigation indicates that neither abutment is suitable for an excavated emergency spillway. A concrete drop structure, or chute structure may be required at the site.

Public Ownership: About 2% of the potential pool area is owned by the Town of Hamilton, Mass.

\*\*\*\*\*

POTENTIAL SITE IP-0433

Location: On Long Causeway Brook about 1,000 feet upstream from Main Street (Route 1A) in Hamilton and Ipswich, Mass. The major portion of the reservoir area is in Hamilton, Mass.

Ipswich, Mass. USGS quadrangle

Latitude: 42°38'45" Longitude: 70°50'49"

Map Sheet 3

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	House	30
	Barn	30

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock in the abutments may be shallow. Depth to bedrock in the foundation is estimated to be from 5 to 10 feet. Waterholding capabilities appear to be good if cutoff is made to bedrock. Pervious borrow material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

\*\*\*\*\*

POTENTIAL SITE IP-0434

Location: On Kimball Brook about 2300 feet upstream from Topsfield Road in Ipswich, Mass.

Ipswich, Mass. USGS quadrangle

Latitude: 42°40'30" Longitude: 70°51'01"  
Map Sheet 3

Facilities  
Affected: None below elevation 50.

Geologic  
Conditions: Both abutments are glacial till. Depth to bedrock in the foundation is estimated to be from 30 to 40 feet. Waterholding capabilities appear to be fair. Leakage is expected through the foundation. Borrow material for dam construction was located near the site.

Engineering  
Notes: Preliminary geologic investigation indicates that neither abutment is suitable for an excavated emergency spillway. A concrete drop structure or chute structure may be required at this site. This site was studied in 1967 by Camp, Dresser and McKee as a possible water supply reservoir for the Town of Ipswich.

\*\*\*\*\*

POTENTIAL SITE IP-0435

Location: On an unnamed tributary to the Ipswich River about 150 feet upstream from Heartbreak Road in Ipswich, Mass.

Ipswich, Mass. USGS quadrangle

Latitude: 42°40'09" Longitude: 70°49'42"  
Map Sheet 3

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The drainage area was only 0.14 square miles. Beneficial storage for the site was only 140 acre-feet.

\*\*\*\*\*

POTENTIAL SITE IP-0436

Location: On an unnamed tributary to the Ipswich River about 550 feet upstream from County Road (Route 1A) in Ipswich, Mass.

Ipswich, Mass. USGS quadrangle

Latitude:  $42^{\circ}40'16''$  Longitude:  $70^{\circ}50'08''$   
Map Sheet 3

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. Beneficial storage for the site was only 80 acre-feet.

\*\*\*\*\*

POTENTIAL SITE IP-0437

Location: On an unnamed tributary to Miles River about 600 feet upstream from Fellows Road in Ipswich, Mass.

Ipswich, Mass. USGS quadrangle

Latitude:  $42^{\circ}39'21''$  Longitude:  $70^{\circ}50'05''$   
Map Sheet 3

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The drainage area is only 0.28 square miles.

\*\*\*\*\*



POTENTIAL SITE IP-0438

Location: On Black Brook about 300 feet upstream from the Boston and Maine Railroad in Hamilton, Mass.

Ipswich, Mass. USGS quadrangle

Latitude:  $42^{\circ}37'34''$  Longitude:  $70^{\circ}51'59''$   
Map Sheet 3

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory. No further investigations were made. The drainage area is only 0.53 square miles. The site appears to have potential only as a shallow marsh.

\*\*\*\*\*

POTENTIAL SITE IP-0439

Location: On an unnamed tributary to the Miles River about 900 feet downstream from Bridge Street in Hamilton, Mass.

Marblehead North, Mass. USGS quadrangle

Latitude:  $42^{\circ}37'08''$  Longitude:  $70^{\circ}50'09''$   
Map Sheet 3

This site was included in a supplementary study of Potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The drainage area is only 0.35 square miles.

\*\*\*\*\*

POTENTIAL SITE IP-0440

Location: On an unnamed tributary to Black Brook about 200 feet upstream from Cutler Road in Hamilton, Mass.

Marblehead north, Mass. USGS quadrangle

Latitude: 42°37'09" Longitude: 70°50'08"  
Map Sheet 3

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	13 houses	50
	School Street	50
	9 houses	45
	Gas pipeline	45
	Bridge Street	45
	House	40

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock in the foundation is estimated to be from 30 to 40 feet. Waterholding capabilities appear to be fair to poor. Leakage is expected through both abutments. Pervious borrow material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The right abutment is recommended for the excavated emergency spillway location.

\*\*\*\*\*

POTENTIAL SITE IP-0441

Location: On an unnamed tributary to Longham Reservoir about 900 feet upstream from Grapevine Road in Wenham, Mass.

Marblehead, Mass. USGS quadrangle

Latitude: 42°35'52" Longitude: 70°50'53"  
Map Sheet 3

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	3 houses	50
	Summer Camp	50
	Route 22	50
	Road (gravel)	50

POTENTIAL SITE IP-0441 (continued)

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock in the foundation is estimated to be from 5 to 10 feet. Waterholding capabilities appear to be poor. Leakage is expected through both abutments. Previous borrow material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The right abutment is recommended for the excavated emergency spillway location. Waterholding capabilities may be improved if a cutoff to bedrock or glacial till can be made.

\*\*\*\*\*

POTENTIAL SITE IP-0442

Location: On an unnamed tributary to Longham Reservoir about 1300 feet upstream from Essex Street in Wenham, Mass.

Marblehead North, Mass. USGS quadrangle

Latitude: 42°35'32" Longitude: 70°50'24"  
Map Sheet 3

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The potential pool area is lined with houses.

\*\*\*\*\*

POTENTIAL SITE IP-0443

Location: On an unnamed tributary to Longham Reservoir at the Wenham-Beverly town line in Beverly, Mass. The site is about 300 feet west of Essex Street.

Marblehead North, Mass. USGS quadrangle

Latitude:  $42^{\circ}35'26''$  Longitude:  $70^{\circ}50'43''$   
Map Sheet 3

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The drainage area is only 0.18 square miles.

\*\*\*\*\*

POTENTIAL SITE IP-0445

Location: On Black Brook about 3600 feet downstream from the Boston and Maine Railroad in Hamilton, Mass.

Ipswich, Mass. USGS quadrangle

Latitude:  $42^{\circ}38'06''$  Longitude:  $70^{\circ}52'24''$   
Map Sheet 3

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	2 houses	50
	Cutler Road	50

Geologic Conditions: Both abutments are thin sand and gravel underlain by granite or granitic gneiss bedrock. Depth to bedrock in the foundation is estimated to be from 25 to 30 feet. Waterholding capabilities appear to be good if cutoff is made to bedrock. Pervious borrow material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The right abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

\*\*\*\*\*



POTENTIAL SITE IP-0446

Location: On an unnamed tributary to Black Brook about 1,100 feet upstream from Winthrop Street in Hamilton, Mass.

Georgetown, Mass. USGS quadrangle

Latitude:  $42^{\circ}38'47''$  Longitude:  $70^{\circ}52'41''$   
Map Sheet 3

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The drainage area is only 0.22 square miles. Beneficial storage for the site was only 115 acre-feet.

\*\*\*\*\*

POTENTIAL SITE IP-0447

Location: On Mile Brook about 2900 feet downstream from Perkins Row in Topsfield, Mass.

Georgetown, Mass. USGS quadrangle

Latitude:  $42^{\circ}38'16''$  Longitude:  $70^{\circ}55'15''$   
Map Sheet 3

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The upper portion of the pool area is now developed.

\*\*\*\*\*

POTENTIAL SITE IP-0448

Location: On an unnamed tributary to Fish Brook about 500 feet upstream from Middleton Road in Boxford, Mass.

Georgetown, Mass. USGS quadrangle

Latitude: 42°38'05" Longitude: 70°58'57"

Map Sheet 2

Facilities Affected: None below elevation 80

Geologic Conditions: Both abutments are thin outwash sand and gravel underlain by granitic bedrock. Depth to bedrock in the foundation is estimated to be from 10 to 15 feet. Waterholding capabilities appear to be fair. Leakage is expected through both abutments and the foundation. Previous borrow material for dam construction was located near the site; impervious material was not located.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock. Waterholding capabilities may be improved if a cut-off to bedrock can be made. It appears that the site is being developed as a housing subdivision.

\*\*\*\*\*

POTENTIAL SITE IP-0449

Location: On an unnamed tributary to Bishop Meadow and Nichols Brook at Nichols Street in Danvers, Mass.

Salem, Mass. USGS quadrangle

Latitude: 42°35'38" Longitude: 70°58'02"

Map Sheet 2

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	Barn	110
	Route 62	110
	Road (gravel)	100
	Nichols Street	80

Geologic Conditions: Both abutments are outwash sand and gravel. Depth to bedrock in the foundation is estimated to be from 20 to 30 feet. Waterholding capabilities appear to be fair to poor. Leakage is expected through both abutments and the foundation. Borrow material for dam construction was located near the site.

POTENTIAL SITE IP-0449 (continued)

Engineering Notes: Preliminary geologic investigation indicates that neither abutment is suitable for an excavated emergency spillway. A concrete drop structure or chute structure may be required at the site.

Public Ownership: About 75% of the potential pool area is owned by Essex County. Five percent is owned by the Massachusetts Department of Mental Health.

\*\*\*\*\*

POTENTIAL SITE IP-0450

Location: On an unnamed tributary to Wenham Swamp and the Ipswich River about 100 feet upstream from Salem Street in Topsfield, Mass.

Salem, Mass. USGS quadrangle

Latitude: 42°36'41" Longitude: 70°56'41"  
Map Sheet 3

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	House	100
	House	90
	Road (gravel)	80
	House	70

Geologic Conditions: Both abutments are glacial till. There are springs on the left abutment. Depth to bedrock in the foundation is estimated to be from 20 to 30 feet. Waterholding capabilities appear to be good. Borrow material for dam construction was located near the site.

Engineering Notes: Preliminary geologic investigation indicates that neither abutment is suitable for an excavated emergency spillway. A concrete drop structure or chute structure may be required at the site. This site was studied by Camp, Dresser and McKee as a possible water supply reservoir for the Salem-Beverly Water Board. Acquisition of land is now in progress.

\*\*\*\*\*

POTENTIAL SITE IP-0451

Location: On an unnamed tributary to Norris Brook about 600 feet upstream from the Peabody-Lynnfield town line in Lynnfield, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}31'56''$  Longitude:  $71^{\circ}01'03''$   
Map Sheet 2

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. Beneficial storage for the site was only 100 acre-feet.

\*\*\*\*\*

POTENTIAL SITE IP-0452

Location: On Norris Brook about 900 feet upstream from the Danvers-Peabody town line in Peabody, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}33'35''$  Longitude:  $71^{\circ}00'07''$   
Map Sheet 2

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The potential pool area is lined with houses.

\*\*\*\*\*



POTENTIAL SITE IP-0453

Location: On an unnamed tributary to the Skug River about 200 feet upstream from Jenkins Road in Andover, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}37'05''$  Longitude:  $71^{\circ}05'35''$   
Map Sheet 1

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this study.

No further investigations were made. The drainage area is only 0.22 square miles.

\*\*\*\*\*

POTENTIAL SITE IP-0454

Location: On the Skug River about 1700 feet downstream from Salem Street in Andover, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}37'09''$  Longitude:  $71^{\circ}06'01''$   
Map Sheet 1

Facilities Affected:	<u>Facility</u>	<u>Elevation</u>
	2 houses	150
	3 houses	145
	Salem Street	140
	Road (gravel)	140

Geologic Conditions: Both abutments are granite bedrock overlain by thin, discontinuous glacial drift. Depth to bedrock in the foundation is estimated to be from 30 to 40 feet. Waterholding capabilities appear to be good if cutoff is made through outwash sand and gravel on the right bank of the stream. Borrow material for dam construction was not located near the site.

Engineering Notes: The right abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

Public Ownership: About 50% of the potential pool area is owned by the Massachusetts Department of Natural Resources, Division of Forests and Parks.

\*\*\*\*\*

POTENTIAL SITE IP-0455

Location: On an unnamed tributary to Brackett Pond and the Skug River about 800 feet upstream from the pond in Andover, Mass.

Reading, Mass. USGS quadrangle

Latitude:  $42^{\circ}37'02''$  Longitude:  $71^{\circ}06'37''$   
Map Sheet 1

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The drainage area is only 0.37 square miles.

\*\*\*\*\*

POTENTIAL SITE IP-0456

Location: On an unnamed tributary to Fish Brook about 200 feet upstream from Main Street in Boxford, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}40'22''$  Longitude:  $71^{\circ}01'28''$   
Map Sheet 2

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	5 houses	140
	Herrick Road	140
	10 houses	135

Geologic Conditions: The right abutment is schist bedrock overlain by thin, discontinuous, outwash sand and gravel. The left abutment is bedrock with some outwash sand and gravel. Bedrock in the foundation is at, or near, the surface. Waterholding capabilities appear to be good. Borrow material for dam construction was not located near the site.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

\*\*\*\*\*

POTENTIAL SITE IP-0457

Location: On an unnamed tributary to Mosquito Brook about 900 feet upstream from the North Andover-Boxford town line in Boxford, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}41'12''$  Longitude:  $71^{\circ}03'05''$   
Map Sheet 2

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The drainage area is only 0.12 square miles.

\*\*\*\*\*

POTENTIAL SITE IP-0458

Location: On an unnamed tributary to Mosquito Brook about 500 feet upstream from Mosquito Brook. The site is between Bradford Street and Salem Street in North Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}40'17''$  Longitude:  $71^{\circ}04'51''$   
Map Sheet 2

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this inventory.

No further investigations were made. The drainage area is only 0.32 square miles.

\*\*\*\*\*



POTENTIAL SITE IP-0459

Location: On Skug River about 250 feet upstream from Gray Road in Andover, Mass. Most of the reservoir area is in North Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}37'57''$  Longitude:  $71^{\circ}05'54''$   
Map Sheet 1

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	10 houses	195
	Barn	195
	Tucker Road	190

Geologic Conditions: Both abutments are schist bedrock overlain by thin, discontinuous, englacial drift. Bedrock is at, or near, the surface in the foundation. Waterholding capabilities appear to be good if cutoff is made to bedrock in the foundation. Borrow material for dam construction was located near the site.

Engineering Notes: The left abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

\*\*\*\*\*

POTENTIAL SITE IP-0460

Location: On an unnamed tributary to Boston Brook about 2700 feet upstream from Salem Turnpike, (Route 114-125) in Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}39'08''$  Longitude:  $71^{\circ}06'11''$   
Map Sheet 2

Facilities	<u>Facility</u>	<u>Elevation</u>
Affected:	2 houses	250

Geologic Conditions: Both abutments are thin discontinuous deposits of glacial till with bedrock outcrops. Depth to bedrock in the foundation is estimated to be from 5 to 10 feet. Waterholding capabilities appear to be good. Borrow material for dam construction was located near the site.

Engineering Notes: The right abutment is recommended for the emergency spillway location. The spillway will probably be excavated in bedrock.

Public Ownership: About 50% of the potential pool area is owned by the Commonwealth of Massachusetts.

\*\*\*\*\*



POTENTIAL SITE IP-0461

Location: On an unnamed tributary to Boston Brook about 2400 feet upstream from Salem Turnpike (Routes 114-125) in Andover, Mass.

South Groveland, Mass. USGS quadrangle

Latitude:  $42^{\circ}38'55''$  Longitude:  $71^{\circ}06'10''$   
Map Sheet 2

This site was included in a supplementary study of potential reservoir sites, prepared by the Soil Conservation Service in 1965. The site does not meet criteria for this study.

No further investigations were made. The drainage area is only 0.27 square miles.

\*\*\*\*\*

EXISTING SITE IP-0444 (Norwood Pond)

Location: On an unnamed tributary to the Miles River about 700 feet upstream from Dodge Street in Beverly, Mass.

Marblehead North, Mass. USGS quadrangle  
Map Sheet 3

Surface Area (Acres)	Height of Dam (FT.)	Drainage Area (Acres)	(Sq. Mi.)
<u>45</u>	<u>6</u>	<u>780</u>	<u>1.22</u>

Potential for Expansion: It appears that the pool could be raised 7 - 10 feet without affecting many facilities. Surface area would be more than doubled. The small drainage area limits expansion potential. Leakage through both abutments may be a problem.

Remarks: The dam is a very short earth-fill structure. The spillway is a 3-foot wide concrete drop structure equipped with flashboards. The dam is in poor condition. There is erosion around the ends of the spillway wingwalls.

Ownership and Use: The site is owned by the Commonwealth of Massachusetts - North-shore Community College and is used for recreation.

\*\*\*\*\*

# SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

STUDY AREA-IPSWICH RIVER										SUBWATERSHED										IPSWICH RIVER									
BENEFICIAL POOL										EMERGENCY SPILLWAY										DESIGN HIGH WATER									
ELEV	STORAGE	COST/	DEPTH	COST	STORAGE	CREST	STORAGE	COST	PER	AC FT	EMERGENCY	SPILLWAY	COST	PER	AC FT	DESIGN	HIGH WATER	DAM	YIELD	SAFE	FILL	TOP	ELEV	HGT	VOL	PERCENT	CHANCE	AT 95	
(MSL)	AC FT	IN	(FT)	(AC)	(AC)	TYPE	AC FT	IN	(AC)	(AC)	(MSL)	AC FT	IN	(AC)	(AC)	(MSL)	(AC)	(MSL)	(AC)	(MGD)	(MGD)	(CY)	(CY)	(CY)	(CY)	(CY)	(CY)	(CY)	
DA= 1.80 SQ MI = 1152 AC										USGS QUAD-READING MASS										LATITUDE 42-34-14 LONGITUDE 71-02-57									
SITE-IP-0410										SITE-IP-0411										SITE-IP-0412									
DA= 1.80 SQ MI = 1152 AC										USGS QUAD-READING MASS										LATITUDE 42-34-14 LONGITUDE 71-02-57									
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# SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

STUDY AREA-IPSWICH RIVER									
SUBWATERSHED IPSWICH RIVER									
BENEFICIAL POOL									
ELEV	STORAGE	COST PER AC FT	AREA	COST SURF AC	DEPTH AT DAM	CREST ELEV	STORAGE AT CREST	COST PER AC FT	DESIGN HIGH WATER
(MSL)	AC FT	IN	(AC)	(\$)	(FT)	++ TYPE	AC FT	IN	(MSL) (AC) (MSL) (CY) (MGD)
DA= 6.00 SQ MI = 3840 AC									
USGS QUAD-READING MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-36-32 LONGITUDE 71-00-33									
RUNOFF = 7.00 IN, PEAK FLOW = 1433 CFS									
SITE-RATING (1)									
63.6	0	0.0	45	8790	3.2	72.0 E	1328	4.1	990
65.1	100	0.3	85	8790	3.2	65.1 N	148	0.5	5020
68.1	451	1.4	161	8750	6.1	70.6 E	987	3.0	1430
70.0	801	2.5	2090	7900	8.0	72.5 E	1473	4.6	1140
72.5	1419	4.4	1430	7280	10.5	75.0 E	2252	7.0	900
*****									
SITE-IP-0414									
DA= 4.10 SQ MI = 2624 AC									
USGS QUAD-SO GROVELAND MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-39-06 LONGITUDE 71-04-06									
RUNOFF = 6.80 IN, PEAK FLOW = 1122 CFS									
SITE-RATING (2)									
102.5	0	0.0	23	12760	2.5	116.0 E	1191	5.4	480
105.3	100	0.5	49	12760	5.3	115.8 E	1163	5.3	530
111.6	586	2.7	1530	8310	11.6	118.1 E	1532	7.0	580
118.3	1557	7.1	1040	9190	18.4	122.8 E	2514	11.5	650
122.5	2386	10.8	920	9450	22.5	125.0 E	3048	13.8	720
*****									
SITE-IP-0415									
DA= 5.90 SQ MI = 3776 AC									
USGS QUAD-SO GROVELAND MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-59 LONGITUDE 71-02-35									
RUNOFF = 6.80 IN, PEAK FLOW = 1603 CFS									
SITE-RATING (3)									
88.0	0	0.0	15	41770	6.0	107.8 E	2052	6.5	1240
92.1	100	0.3	40	41770	10.1	92.1 T	147	0.5	11410
100.9	823	2.5	3920	25660	18.9	109.3 E	2377	7.6	1360
109.1	2270	7.1	2210	22200	27.0	113.6 E	3813	12.1	1310
112.5	3284	10.3	1780	15010	30.5	115.0 E	4488	14.2	1300

NOTES - (1) COSTS ARE BASED ON 1972 S.C.S. DESIGN CRITERIA AND COST DATA.

(2) EMERGENCY SPILLWAY STORAGE AND COSTS ARE BASED ON TOTAL STORAGE, INCLUDING BENEFICIAL POOL.

(3) EMERGENCY SPILLWAY TYPE CODE- C=CONCRETE CHUTE, D=CONCRETE DROP, E=EXCAVATED, T= TWO SPILLWAYS, N= NONE

(4) TABULAR DATA ARE BASED ON PRELIMINARY INFORMATION. FIGURES SHOWN ARE PRIMARILY FOR COMPARISON PURPOSES.

(5) ELEVATIONS ARE SHOWN TO THE NEAREST 0.1 FOOT TO SHOW VARIATION BETWEEN DEVELOPMENTS ONLY, AND ARE NOT TO BE CONSIDERED ACCURATE TO THAT DEGREE.

\*\* DO NOT USE FOR FINAL SITE SELECTION OR LAND ACQUISITION. \*\*

# SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

STUDY AREA-IPSWICH RIVER										SUBWATERSHED IPSWICH RIVER									
BENEFICIAL POOL										EMERGENCY SPILLWAY									
ELEV	STORAGE	COST PER AC FT	AREA (AC)	COST SURF AC (\$)	DEPTH AT DAM (FT)	CREST ELEV	STORAGE AT CREST	COST PER AC FT	DESIGN HIGH WATER	DAM	YIELD PERCENT	CHANCE	FILL VOL (1000 CY)	HGT	ELEV (MSL)	AREA (AC)	DESIGN HIGH WATER	DAM	YIELD PERCENT
(MSL)	AC FT IN	(\$)	(AC)	(\$)	(FT)	++ TYPE	AC FT IN	(\$)											
SITE-IP-0416										LATITUDE 42-37-50 LONGITUDE 71-01-25									
SITE RATING (2)										RUNOFF = 6.80 IN, PEAK FLOW = 586 CFS									
80.5	0	0.0	8	19250	6.5	87.5 E	354 4.1	2450	90.9	129	21	30	30	21	95.0	129	21	30	30
84.0	100	1.2	48	19250	10.0	86.5 E	265 3.0	3480	91.0	130	21	30	30	21	95.0	130	21	30	30
90.9	710	8.3	128	10840	16.9	93.4 E	1078 12.6	1290	95.6	187	25	50	50	25	99.0	187	25	50	50
98.0	1931	22.6	215	10350	24.0	100.5 E	2518 29.5	880	101.3	259	30	95	95	30	104.3	259	30	95	95
102.5	3021	35.4	276	10660	28.5	105.0 E	3775 44.2	780	105.1	316	34	146	146	34	108.1	316	34	146	146
SITE-IP-0417										LATITUDE 42-37-03 LONGITUDE 71-00-30									
SITE RATING (1)										RUNOFF = 7.00 IN, PEAK FLOW = 1361 CFS									
52.8	0	0.0	34	23670	4.8	72.1 E	2368 4.1	2260	76.8	556	32	144	144	32	80.0	556	32	144	144
55.0	100	0.2	51	23670	7.1	55.0 N	186 0.3	6510	62.0	104	18	31	31	18	66.0	104	18	31	31
52.0	641	1.1	105	39390	14.1	64.6 E	1018 1.7	4070	73.8	387	31	128	128	31	78.0	387	31	128	128
69.9	1722	3.0	174	33360	21.9	72.4 E	2441 4.3	2370	76.6	547	32	139	139	32	79.0	547	32	139	139
72.5	2387	4.1	315	22070	24.5	72.5 T	2473 4.3	2820	77.9	620	33	185	185	33	80.9	620	33	185	185
SITE-IP-0418										LATITUDE 42-34-18 LONGITUDE 71-00-28									
SITE RATING (1)										RUNOFF = 7.00 IN, PEAK FLOW = 401 CFS									
65.3	0	0.0	8	9590	1.2	72.1 E	221 4.1	1100	74.4	96	13	12	12	13	77.4	96	13	12	12
69.9	100	1.9	36	9590	5.9	72.4 E	244 4.6	1430	74.8	102	14	12	12	14	77.8	102	14	12	12
71.1	160	3.0	52	8440	7.1	73.6 E	339 6.4	1300	76.1	119	15	15	15	15	79.1	119	15	15	15
72.1	221	4.1	67	7670	8.2	74.6 E	440 8.2	1160	76.9	130	16	18	18	16	79.9	130	16	18	18
72.5	242	4.5	71	7460	8.5	75.0 E	471 8.8	1120	77.1	133	16	19	19	16	80.0	133	16	19	19

NOTES - (1) COSTS ARE BASED ON 1972 S.C.S. DESIGN CRITERIA AND COST DATA.  
 (2) EMERGENCY SPILLWAY STORAGE AND COSTS ARE BASED ON TOTAL STORAGE, INCLUDING BENEFICIAL POOL.  
 (3) EMERGENCY SPILLWAY TYPE CODE- C=CONCRETE CHUTE, D=CONCRETE DROP, E=EXCAVATED, T= TWO SPILLWAYS, N= NONE  
 (4) TABULAR DATA ARE BASED ON PRELIMINARY INFORMATION. FIGURES SHOWN ARE PRIMARILY FOR COMPARISON PURPOSES.  
 (5) ELEVATIONS ARE SHOWN TO THE NEAREST 0.1 FOOT TO SHOW VARIATION BETWEEN DEVELOPMENTS ONLY, AND ARE NOT TO BE CONSIDERED ACCURATE TO THAT DEGREE.

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## SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

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STUDY AREA-IPSWICH RIVER										SUBWATERSHED IPSWICH RIVER									
BENEFICIAL POOL										DESIGN * HIGH WATER * DAM									
ELEV	STORAGE	COST PER AC FT	AREA	COST/AC	DEPTH AT	CREST ELEV	STORAGE AT CREST	COST PER AC FT	EMERGENCY SPILLWAY	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM	DESIGN * HIGH WATER * DAM
(MSL)	AC FT	(\$)	(AC)	(\$)	(FT)	(MSL)	AC FT	(\$)	AC FT	IN	(\$)	(MSL)	(AC)	(MSL)	(AC)	(MSL)	(AC)	(MSL)	(AC)
DA= 1.50 SQ MI = 960 AC										USGS QUAD-SO GROVELAND MASS									
STREAM WATER QUALITY (B)										100-YR PRIN SPWY DESIGN STORM									
SITE-IP-0419										LATITUDE 42-39-59 LONGITUDE 71-05-21									
SITE RATING (1)										RUNOFF = 6.80 IN, PEAK FLOW = 470 CFS									
163.3	0	0.0	11	3970	1.4	171.0	E	332	4.1	950	173.3	78	176.5	14	24	24	24	24	24
167.1	100	1.2	42	9420	5.1	169.6	E	242	3.0	1650	172.1	73	175.1	13	21	21	21	21	21
171.5	358	4.5	71	9330	9.5	174.0	E	558	7.0	1190	176.3	87	179.3	17	40	40	40	40	40
177.8	874	10.8	92	12980	15.8	180.3	E	1128	14.1	1060	182.7	115	185.7	24	83	83	83	83	83
182.5	1348	16.7	113	15950	20.5	185.0	E	1661	20.7	1090	187.2	140	190.0	28	134	134	134	134	134
SITE-IP-0420										LATITUDE 42-40-15 LONGITUDE 71-01-07									
SITE RATING (1)										RUNOFF = 6.80 IN, PEAK FLOW = 696 CFS									
128.1	0	0.0	19	13100	2.0	138.6	E	598	4.1	2900	143.8	128	149.3	23	35	35	35	35	35
131.1	100	0.7	43	30450	5.1	133.6	E	246	1.7	5310	141.3	104	146.7	21	27	27	27	27	27
134.8	296	2.0	63	31610	8.8	137.3	E	493	3.4	4060	144.1	131	149.2	23	35	35	35	35	35
139.8	689	4.8	91	31530	13.8	142.3	E	973	6.8	2960	146.3	152	149.3	23	35	35	35	35	35
142.5	959	6.6	116	32020	16.5	145.0	E	1300	9.0	2850	147.8	166	150.0	24	37	37	37	37	37
SITE-IP-0421										LATITUDE 42-39-44 LONGITUDE 71-02-04									
SITE RATING (1)										RUNOFF = 6.80 IN, PEAK FLOW = 1726 CFS									
110.8	100	0.2	96	14930	6.8	113.3	E	674	1.5	2210	117.0	634	120.0	10	20	20	20	20	20
112.1	293	0.6	211	9020	8.2	114.6	E	1169	2.5	1630	117.6	691	120.6	17	43	43	43	43	43
112.5	376	0.8	242	8350	8.5	112.5	T	444	1.0	4540	117.8	706	120.8	17	46	46	46	46	46

NOTES - (1) COSTS ARE BASED ON 1972 S.C.S. DESIGN CRITERIA AND COST DATA.

(2) EMERGENCY SPILLWAY STORAGE AND COSTS ARE BASED ON TOTAL STORAGE, INCLUDING BENEFICIAL POOL.

(3) EMERGENCY SPILLWAY TYPE CODE- C=CONCRETE CHUTE, D=CONCRETE DROP, E=EXCAVATED, T= TWO SPILLWAYS, N= NONE

(4) TABULAR DATA ARE BASED ON PRELIMINARY INFORMATION. FIGURES SHOWN ARE PRIMARILY FOR COMPARISON PURPOSES.

(5) ELEVATIONS ARE SHOWN TO THE NEAREST 0.1 FOOT TO SHOW VARIATION BETWEEN DEVELOPMENTS ONLY, AND ARE NOT TO BE CONSIDERED ACCURATE TO THAT DEGREE.

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SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

STUDY AREA-IPSWICH RIVER										SUBWATERSHED IPSWICH RIVER									
BENEFICIAL POOL										EMERGENCY SPILLWAY									
ELEV	STORAGE	COST PER AC FT	AREA (AC)	COST SURF AC (\$)	DEPTH AT DAM (FT)	CREST ELEV	STORAGE AT CREST	COST PER AC FT		DESIGN	HIGH WATER	DAM	SAFE	YIELD					
(MSL)	AC FT	IN				++ TYPE	AC FT	IN	(\$)	(MSL)	(AC)	(MSL)	FT	CY					
DA= 0.80 SQ MI = 512 AC										LATITUDE 42-39-27 LONGITUDE 71-00-50									
STREAM WATER QUALITY (B)										RUNOFF = 6.80 IN, PEAK FLOW = 311 CFS									
SITE-IP-0422																			
SITE RATING (2)																			
88.5	0	0.0	5	5	2.5	97.9 E	177	4.1	1650	101.6	49	105.6	20	25					
95.5	100	2.3	4110	25	9.5	98.0 E	181	4.1	2280	102.5	53	106.1	20	27					
97.8	169	4.0	2870	33	11.8	100.3 E	269	6.3	1800	104.3	62	107.8	22	34					
99.8	238	5.6	2330	40	13.7	102.3 E	360	8.3	1540	105.6	69	109.1	23	41					
102.5	366	8.6	1860	53	16.5	105.0 E	520	12.2	1310	107.1	76	110.0	24	47					
DA= 4.80 SQ MI = 3072 AC										LATITUDE 42-38-43 LONGITUDE 70-59-24									
STREAM WATER QUALITY (B)										RUNOFF = 6.80 IN, PEAK FLOW = 771 CFS									
SITE-IP-0423																			
SITE RATING (1)																			
64.1	100	0.4	10630	38	6.1	66.6 E	247	1.0	4300	73.6	109	78.1	20	27					
67.0	229	0.8	5960	51	9.0	69.5 E	408	1.6	3350	75.3	128	78.8	21	30					
69.3	358	1.4	5070	61	11.3	71.8 E	580	2.3	3130	76.8	146	79.8	22	35					
72.5	601	2.3	4010	94	14.5	75.0 E	914	3.5	2640	78.1	161	80.0	22	36					
DA= 1.90 SQ MI = 1216 AC										LATITUDE 42-40-45 LONGITUDE 70-59-57									
STREAM WATER QUALITY (B)										RUNOFF = 6.80 IN, PEAK FLOW = 596 CFS									
SITE-IP-0425																			
SITE RATING (2)																			
103.0	0	0.0	15	15	1.0	109.5 E	421	4.1	1200	112.0	150	115.0	13	3					
105.8	100	1.0	5030	58	3.9	108.3 E	308	3.0	1630	110.8	131	113.8	12	3					
108.3	292	2.9	2440	94	6.4	110.8 E	591	5.8	1210	113.3	173	116.3	14	4					
110.1	483	4.8	1800	121	8.2	112.6 E	856	8.5	1010	115.1	202	118.1	16	6					
112.5	801	7.8	1420	158	10.5	115.0 E	1266	12.5	900	116.8	232	120.0	18	8					

NOTES - (1) COSTS ARE BASED ON 1972 S.C.S. DESIGN CRITERIA AND COST DATA.  
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# SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

STUDY AREA-IPSWICH RIVER									
BENEFICIAL POOL									
SURWATERSHED IPSWICH RIVER									
EMERGENCY SPILLWAY									
DESIGN * HIGH WATER *									
DAM									
SAFE YIELD									
AT 95 PERCENT CHANCE									
FILL VOL (1000 CY) * (MGD)									
LATITUDE 42-38-45 LONGITUDE 70-50-49									
RUNOFF = 6.70 IN, PEAK FLOW = 613 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-40-30 LONGITUDE 70-51-01									
RUNOFF = 6.70 IN, PEAK FLOW = 332 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
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LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
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LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
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LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
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LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
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LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
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LATITUDE 42-37-09 LONGITUDE 70-50-08									
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USGS QUAD-IPSWICH MASS									
100-YR PRIN SPWY DESIGN STORM									
USGS QUAD-MARBLEHEAD NO MASS									
100-YR PRIN SPWY DESIGN STORM									
LATITUDE 42-37-09 LONGITUDE 70-50-08									
RUNOFF = 6.50 IN, PEAK FLOW = 283 CFS									
USGS QUAD-									



## SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

## STUDY AREA-IPSWICH RIVER

## SUBWATERSHED IPSWICH RIVER

BENEFICIAL POOL										EMERGENCY SPILLWAY										DESIGN										DAM										SAFE									
																				HIGH WATER																				YIELD									
																																								AT 95									
																																								PERCENT									
																																								CHANCE									
																																								FILL									
																																								VOL									
																																								(1000									
																																								CY)									
																																								(MGD)									

SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

STUDY AREA-IPSWICH RIVER										SUBWATERSHED IPSWICH RIVER									
BENEFICIAL POOL										EMERGENCY SPILLWAY									
ELEV	STORAGE	COST PER AC FT	AREA (AC)	DEPTH AT DAM (FT)	CREST ELEV	STORAGE AT CREST	COST PER AC FT	DESIGN HIGH WATER	YIELD AT 95 PERCENT CHANCE	ELEV	STORAGE	CREST ELEV	STORAGE AT CREST	COST PER AC FT	ELEV AREA	TOP ELEV	HGT VOL (1000 CY)	DA	SAFE
(MSL)	AC FT	IN	(\$)	(AC)	(FT)	(MSL)	AC FT	IN	(\$)	(MSL)	AC	(MSL)	AC	(MSL)	(AC)	(MSL)	FT	CY	(MGD)
DA= 0.50 SQ MI = 320 AC										USGS QUAD-SALEM MASS									
STREAM WATER QUALITY (B)										100-YR PRIN SPWY DESIGN STORM									
SITE RATING (3)										RUNOFF = 6.60 IN, PEAK FLOW = 189 CFS									
77.6	0	0.0	4	1.6	84.3	E	111	4.1	3760	86.8	45	91.4	15	24	24	24	24	24	24
84.1	100	3.8	31	8.1	84.1	E	104	3.9	8360	87.9	51	91.9	16	26	26	26	26	26	26
89.9	367	13.7	62	18.650	89.9	E	371	13.8	3110	92.6	72	96.1	20	41	41	41	41	41	41
97.0	901	33.8	88	19350	97.0	E	905	34.0	1880	99.5	97	102.5	26	77	77	77	77	77	77
102.5	1436	53.8	104	20730	102.5	C	1440	54.0	1500	105.0	109	108.0	32	118	118	118	118	118	118
102.5	1436	53.8	104	20730	102.5	C	1440	54.0	1500	105.0	109	108.0	32	118	118	118	118	118	118
DA= 0.50 SQ MI = 320 AC										USGS QUAD-SALEM MASS									
STREAM WATER QUALITY (B)										100-YR PRIN SPWY DESIGN STORM									
SITE RATING (1)										RUNOFF = 6.60 IN, PEAK FLOW = 189 CFS									
56.1	0	0.0	3	2.2	66.6	E	111	4.1	4590	70.4	19	80.3	26	51	51	51	51	51	51
66.3	100	3.8	15	60690	66.3	E	104	3.9	8740	72.0	20	80.5	26	52	52	52	52	52	52
74.0	243	9.1	22	68900	74.0	E	247	9.3	6160	78.9	27	86.4	32	90	90	90	90	90	90
84.5	528	19.7	33	79890	84.5	E	532	20.0	5000	88.5	39	94.4	40	164	164	164	164	164	164
92.0	814	30.5	44	79170	92.0	C	818	30.7	4260	94.8	49	97.8	44	205	205	205	205	205	205
92.5	838	31.4	45	79640	92.5	C	842	31.5	4260	95.3	50	98.3	44	212	212	212	212	212	212
DA= 1.90 SQ MI = 1216 AC										USGS QUAD-READING MASS									
STREAM WATER QUALITY (B)										100-YR PRIN SPWY DESIGN STORM									
SITE RATING (1)										RUNOFF = 7.00 IN, PEAK FLOW = 717 CFS									
131.3	0	0.0	15	1.2	138.3	E	421	4.1	1550	142.2	130	147.1	17	47	47	47	47	47	47
134.3	100	1.0	51	18960	134.3	N	115	1.1	8430	143.0	135	149.8	20	69	69	69	69	69	69
137.1	289	2.9	84	14520	137.1	E	549	5.4	2220	144.0	141	148.6	19	58	58	58	58	58	58
140.8	668	6.6	122	13660	140.8	E	1007	9.8	1660	146.3	155	149.6	20	66	66	66	66	66	66
142.5	887	8.8	132	14830	142.5	E	1252	12.3	1570	147.3	161	150.0	20	70	70	70	70	70	70

NOTES - (1) COSTS ARE BASED ON 1972 S.C.S. DESIGN CRITERIA AND COST DATA.  
 (2) EMERGENCY SPILLWAY STORAGE AND COSTS ARE BASED ON TOTAL STORAGE, INCLUDING BENEFICIAL POOL.  
 (3) EMERGENCY SPILLWAY TYPE CODE- C=CONCRETE CHUTE, D=CONCRETE DROP, E=EXCAVATED, T= TWO SPILLWAYS, N= NONE  
 (4) TABULAR DATA ARE BASED ON PRELIMINARY INFORMATION. FIGURES SHOWN ARE PRIMARILY FOR COMPARISON PURPOSES.  
 (5) ELEVATIONS ARE SHOWN TO THE NEAREST 0.1 FOOT TO SHOW VARIATION BETWEEN DEVELOPMENTS ONLY, AND ARE NOT TO BE CONSIDERED ACCURATE TO THAT DEGREE.

\*\* DO NOT USE FOR FINAL SITE SELECTION OR LAND ACQUISITION. \*\*



# SUMMARY DATA FOR POTENTIAL UPSTREAM RESERVOIR SITES

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STUDY AREA-IPSWICH RIVER										SUBWATERSHED IPSWICH RIVER														
BENEFICIAL POOL										EMERGENCY SPILLWAY														
ELEV	STORAGE	PER	AREA	COST/	DEPTH	CREST	STORAGE	COST		DESIGN	DAM	SAFE	YIELD											
(MSL)	AC FT	IN	(AC)	(AC)	(FT)	(MSL)	AC FT	IN	(AC)	AREA	FT	(MGD)	AT 95											
DA= 0.50 SQ MI = 320 AC										LATITUDE 42-40-22 LONGITUDE 71-01-28														
STREAM WATER QUALITY (B)										RUNOFF = 6.80 IN, PEAK FLOW = 195 CFS														
SITE RATING (1)										LATITUDE 42-37-57 LONGITUDE 71-05-54														
122.3	0	0.0	4	3390	51	6680	0.3	0.0	126.1	E	111	4.1	1970	128.0	76	131.0	9	8	11	14	18	22	26	30
126.0	100	3.8	51	6680	4.0	0.3	0.3	0.0	128.5	E	273	10.2	1240	129.3	93	132.3	10	11	14	18	22	26	30	34
128.3	250	9.3	80	7240	6.3	0.3	0.3	0.0	130.8	E	491	18.4	1170	130.8	107	133.8	12	14	18	22	26	30	34	38
130.0	400	15.0	101	9140	8.0	0.3	0.3	0.0	132.5	E	682	25.6	1350	132.5	119	135.5	14	18	22	26	30	34	38	42
132.5	678	25.4	119	12120	10.5	0.3	0.3	0.0	135.0	E	1005	37.7	1440	135.0	138	138.0	16	28	32	36	40	44	48	52
DA= 0.70 SQ MI = 448 AC										USGS QUAD-SO GROVELAND MASS														
STREAM WATER QUALITY (B)										100-YR PRIN SPWY DESIGN STORM														
SITE RATING (1)										RUNOFF = 6.80 IN, PEAK FLOW = 272 CFS														
172.8	0	0.0	6	3650	39	9450	0.8	0.0	178.3	E	155	4.1	1570	181.2	66	184.3	12	19	21	23	25	27	29	31
177.3	100	2.7	39	9450	5.3	0.3	0.3	0.0	179.8	E	223	6.0	1640	182.5	74	185.6	14	21	23	25	27	29	31	33
182.3	383	10.3	73	7590	10.3	0.3	0.3	0.0	184.8	E	588	15.7	940	186.2	96	189.2	17	32	34	36	38	40	42	44
188.5	948	25.4	110	8020	16.5	0.3	0.3	0.0	191.0	E	1248	33.4	710	191.3	128	194.3	22	54	56	58	60	62	64	66
192.5	1441	38.5	135	9710	20.5	0.3	0.3	0.0	195.0	E	1802	48.3	730	195.0	150	198.0	26	75	77	79	81	83	85	87
DA= 1.50 SQ MI = 960 AC										USGS QUAD-SO GROVELAND MASS														
STREAM WATER QUALITY (B)										100-YR PRIN SPWY DESIGN STORM														
SITE RATING (1)										RUNOFF = 6.80 IN, PEAK FLOW = 584 CFS														
231.3	0	0.0	7	5680	29	19800	5.4	0.0	242.0	E	332	4.1	1610	245.7	122	249.6	24	62	64	66	68	70	72	74
237.0	100	1.2	29	5680	11.0	0.3	0.3	0.0	239.5	E	195	2.4	2910	245.2	116	249.1	23	57	59	61	63	65	67	69
239.3	182	2.3	38	3590	13.3	0.3	0.3	0.0	241.8	E	325	4.1	2000	246.0	126	249.2	23	58	60	62	64	66	68	70
241.1	264	3.3	56	2810	15.1	0.3	0.3	0.0	243.6	E	459	5.6	1620	246.7	138	249.7	24	63	65	67	69	71	73	75
242.5	356	4.4	76	2470	16.5	0.3	0.3	0.0	245.0	E	603	7.5	1460	247.5	147	250.0	24	65	67	69	71	73	75	77

NOTES - (1) COSTS ARE BASED ON 1972 S.C.S. DESIGN CRITERIA AND COST DATA.  
 (2) EMERGENCY SPILLWAY STORAGE AND COSTS ARE BASED ON TOTAL STORAGE, INCLUDING BENEFICIAL POOL.  
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 (4) TABULAR DATA ARE BASED ON PRELIMINARY INFORMATION. FIGURES SHOWN ARE PRIMARILY FOR COMPARISON PURPOSES.  
 (5) ELEVATIONS ARE SHOWN TO THE NEAREST 0.1 FOOT TO SHOW VARIATION BETWEEN DEVELOPMENTS ONLY, AND ARE NOT TO BE CONSIDERED ACCURATE TO THAT DEGREE.

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EXISTING SITE IP-0462 (Field Pond)

Location: On an unnamed tributary to the Skug River between Harold Parker Road and Gould Road in Andover, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 1

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>55</u>	<u>15</u>	<u>550</u>	<u>0.8</u>

Potential for Expansion: Significant expansion does not appear practical. Extensive diking will be required for expansion that would not significantly increase the surface area or storage.

Remarks: The dam is an earth-fill structure. The principal spillway is a concrete riser with a drain-gate and flashboards. The emergency spillway is a 40-foot wide concrete and rock chute. There are trees growing on the dam and large stumps in the rock portion of the emergency spillway.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources and is used as a bass rearing pond.

\*\*\*\*\*

EXISTING SITE IP-0463 (Brackett Pond)

Location: On an unnamed tributary to the Skug River about 800 feet upstream from Harold Parker Road in Andover, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 1

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>18</u>	<u>20</u>	<u>350</u>	<u>0.5</u>

Potential for Expansion: It appears that the pool could be raised about 20 feet without affecting facilities other than roads. Surface area would not be significantly increased. A 1600 foot long dam would be needed.

Remarks: The dam is an earth-fill structure. The spillway is a concrete riser with a gate control. Trees are growing on the dam. There is leakage around the spillway system. Fill material used in dam construction appears to be outwash sand and gravel. The spillway is in poor condition.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources and is used as a bass rearing pond.

\*\*\*\*\*



EXISTING SITE IP-0464 (Collins Pond)

Location: On an unnamed tributary to the Skug River about 50 feet upstream from Harold Parker Road in Andover, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 1

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>originally 7</u>	<u>20</u>	<u>350</u>	<u>0.5</u>

Potential for Expansion: It appears that the dam could be rebuilt and the former pond re-established. Further expansion would affect Brackett Pond which is immediately upstream.

Remarks: The dam is a concrete structure with a pipe spillway. The emergency spillway is a 30 foot wide concrete structure. All of the concrete in the dam is cracked and spalled. The pond has been drained; probably because of the poor condition of the dam and spillway.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources and is used as a bass rearing pond.

\*\*\*\*\*

EXISTING SITE IP-0465 (Middleton Pond)

Location: On an unnamed tributary to the Ipswich River about 1300 feet upstream from South Main Street (Route 114) in Middleton, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>130</u>	<u>12</u>	<u>1050</u>	<u>1.6</u>

Potential for Expansion: It appears that the pool could be raised 10 feet without affecting facilities other than Lake Street. Surface area would not be significantly increased. Expansion would appear to require diversion of water from outside the site drainage area.

EXISTING SITE IP-0465 (continued)

Remarks: The dam is a long, low, concrete structure with rock rip-rap on the upstream face. The spillway is a concrete weir; 40 feet long and 6 feet deep. Storage capacity of the reservoir is increased by 3-feet high flashboards. The outlet channel is a concrete chute. Much of the concrete in the dam has cracked and been patched.

Ownership and Use: The site is owned by the Danvers Water Department and is used as a water supply reservoir.

\*\*\*\*\*

EXISTING SITE IP-0466 (Devils Dishfull Pond)

Location: On Norris Brook at Lake Street in Peabody, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>30</u>	<u>6</u>	<u>1300</u>	<u>2.0</u>

Potential for Expansion: Significant expansion does not appear practical. The pond is surrounded by streets, a railroad and houses.

Remarks: The dam is an earth-fill structure with Lake Street across the top. The spillway consists of a rock and earth-fill overflow section and a road culvert under Lake Street.

Ownership and Use: The site is owned by Bella Vista Homes and is used for wildlife habitat.

\*\*\*\*\*

EXISTING SITE IP-0467 (Suntaug Lake)

Location: On Norris Brook about 3200 feet downstream from Route 1 on the Peabody-Lynnfield town line. Half of the reservoir is in each town.

Reading, Mass. USGS quadrangle  
Map Sheet 2

Surface Area  
(Acres)  

---

160

Drainage Area  
(Acres) (Sq. Mi.)  

---

300 0.5

Potential for Expansion: It appears that the pool could be raised 5-10 feet without affecting many facilities. Surface area would not be significantly increased. Expansion would appear to require diversion of water from outside the site drainage area.

Remarks: An old earth-fill dam at the site has been removed. The site is used as a pumped storage reservoir with pumping from the Ipswich River.

Ownership and Use: The site is owned by the Lynn Water Department and is used as a water supply reservoir.

\*\*\*\*\*

EXISTING SITE IP-0468 (Swan Pond)

Location: On an unnamed tributary to Boston Brook about 2300 feet west of North Reading-Middleton town line in North Reading, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 2

Surface Area  
(Acres)  

---

45

Drainage Area  
(Acres) (Sq. Mi.)  

---

150 0.2

Potential for Expansion: It appears that the pool could be raised 10 feet without affecting any facilities. Surface area would not be significantly increased. Any further increase would affect many cottages that line the southwest shore of the pond. Expansion would appear to require diversion of water from outside the site drainage area.

Remarks: There is no dam at this pond. Overflow occurs through a marsh area at the northwest end of the pond.

Ownership and Use: The site is owned by the Danvers Water Department and is used as a water supply reservoir.

\*\*\*\*\*



EXISTING SITE IP-0469 (Eisenhoures Pond)

Location: On an unnamed tributary to the Ipswich River about 1500 feet upstream from Haverhill Street in North Reading, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 1

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres) (Sq. Mi.)
<u>7</u>	<u>6</u>	<u>220 0.34</u>

Potential for Expansion: It appears that the pool could be raised by 10-15 feet without affecting facilities. Surface area would be more than doubled. The small drainage area limits expansion potential.

Remarks: The dam is a low earth-fill structure. The spillway is a 4-foot wide concrete drop structure. Many trees are growing on the dam. Concrete in the spillway is cracked and in poor condition.

Ownership and Use: The site is owned by the Eisenhoure family and is used as a wildlife habitat.

\*\*\*\*\*

EXISTING SITE IP-0470 (Bradford Pond)

Location: On an unnamed tributary to the Ipswich River between Haverill Street, Marblehead Street, and Bradford Pond Road in North Reading, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 1

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres) (Sq. Mi.)
<u>9</u>	<u>6</u>	<u>118 0.18</u>

Potential for Expansion: It appears that the pool could be raised 10 feet without affecting facilities. Surface area would be more than doubled. A 1200 foot long dam would be needed. The small drainage area limits expansion potential.

Remarks: The dam is a short earth-fill structure. The spillway is a 10-foot wide concrete chute with stone sidewalls. Concrete in the spillway is cracked and in poor condition.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources - Division of Forests and Parks and is used as a wildlife habitat.

\*\*\*\*\*

EXISTING SITE IP-0471 (Salem Pond)

Location: On an unnamed tributary to Boston Brook about 1100 feet upstream from the North Andover-North Reading town line in North Andover, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>18</u>	<u>10</u>	<u>101</u>	<u>0.15</u>

Potential for Expansion: Significant expansion does not appear practical. Five dikes would be required to permit raising the pool. Surface area would not be significantly increased. The small drainage area limits expansion potential.

Remarks: The dam is a short earth-fill structure with a roadway across the top. The spillway is a 15-foot wide paved chute with stone masonry sidewalls. Large trees are growing on the upstream slope of the dam.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources, Division of Forests and Parks and is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0472 (Stearns Pond)

Location: On an unnamed tributary to Boston Brook about 200 feet upstream from Stearns Pond Road in North Andover, Mass.

North Andover, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>46</u>	<u>15</u>	<u>661</u>	<u>1.03</u>

Potential for Expansion: Significant expansion does not appear practical. Five State Forest roads would be affected. A large area of shallow water would be created. The small drainage area limits expansion potential.

Remarks: The dam is an earth-fill structure. The spillway is a stone masonry weir; 25 feet long and 4 feet deep. Capacity of the reservoir is increased by flashboards. Trees are growing on both slopes of the dam.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources, Division of Forests and Parks and is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0473 (Sudden Pond)

Location: On an unnamed tributary to Boston Brook about 200 feet upstream from the North Andover-North Reading town line in North Andover Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>6</u>	<u>6</u>	<u>112</u>	<u>.17</u>

Potential for Expansion: Significant expansion does not appear practical. Doubling the pool area would require a dam which surrounds three-quarters of the pool. The small drainage area limits expansion potential.

Remarks: The dam is an earth-fill structure. The spillway is a 10-foot wide stone masonry weir with a concrete chute and rock rip-rap apron. The spillway is in poor condition. There are trees growing on the dam.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources and is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0474 (Frye Pond)

Location: On an unnamed tributary to the Skug River at Lorraine Road in Andover, Mass.

Reading, Mass. USGS quadrangle  
Map Sheet 1

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>7</u>	<u>8</u>	<u>646</u>	<u>1.01</u>

Potential for Expansion: It appears that the pool could be raised 5 feet. Surface area would be increased to about 75 acres. A large area of shallow water would be created. Jenkins Road and 5-10 houses would be affected.

Remarks: The dam is an earth-fill structure with Lorraine Road across the top. The spillway is a 10 foot wide concrete drop spillway with flashboards. The exit channel is a concrete chute. The dam and spillway are in good condition.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources and is used for recreation.

\*\*\*\*\*



- 2 -

EXISTING SITE IP-0475 (Elginwood Pond)

Location: On Norris Brook about 900 feet upstream from Lowell Street in Peabody, Mass.

Reading, Mass USGS quadrangle  
Map Sheet 2

Surface Area  
(Acres)  
9

Height of  
Dam (Ft.)  
6

Drainage Area  
(Acres) (Sq. Mi.)  
2094 3.27

Potential for Expansion: Significant expansion does not appear practical. The pond is surrounded by streets, houses, and a railroad.

Remarks: The dam is a concrete and timber A-frame structure. Abutments are concrete. The spillway is constructed of timbers braced at a 45° angle to horizontal. The spillway is about 20 feet wide. Concrete is cracked and there is leakage through the left abutment.

Ownership and Use: The site is owned by the Peabody Conservation Commission and is used as a wildlife habitat.

\*\*\*\*\*

EXISTING SITE IP-0476 (Martins Pond)

Location: On the Skug River at Essex Street in North Reading, Massachusetts.

Reading, Mass. USGS quadrangle  
Map Sheet 1

Surface Area  
(Acres)  
92

Drainage Area  
(Acres) (Sq. Mi.)  
4755 7.43

Potential for Expansion: Significant expansion does not appear practical. About 100 cottages line the shore.

Remarks: This appears to be a natural pond with no dam. Flow passes under Essex Street through 3 corrugated metal pipe arches.

Ownership and Use: The site is owned by many shoreline cottage owners and the Town of North Reading. The site is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0477 (Creighton Pond)

Location: On an unnamed tributary to Boston Brook about 50 feet upstream from Essex Street in Middleton, Mass.

South Groveland, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>28</u>	<u>8</u>	<u>358</u>	<u>0.55</u>

Potential for Expansion: Significant expansion does not appear practical. The pool level could be raised about 10 feet. Surface area would increase to 35 acres. The small drainage area limits the expansion potential.

Remarks: The dam is an earth-fill structure capped with concrete and stone masonry. The spillway is a 4 foot wide concrete chute. Trees are growing on the downstream slope of the dam. Concrete on the dam has cracked and been patched.

Ownership and Use: The site is owned by the Boys Club of Lynn and is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0478 (Farnum Pond)

Location: On Boston Brook about 50 feet upstream from Farnum Street in North Andover, Mass.

South Groveland, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>25</u>	<u>15</u>	<u>1620</u>	<u>2.53</u>

Potential for Expansion: It appears that the pool level could be raised 5 feet without affecting any facilities. Surface area would be nearly doubled. A larger area of shallow water would be created.

Remarks: The dam is an earth-fill structure. The downstream slope adjacent to the mill is faced with stone. The spillway is a 12-foot wide mill race with a timber chute exit channel. Trees are growing on the dam. Dam and spillway are in poor condition.

Ownership and Use: The site is owned by John Farnum and is used to supply power for a sawmill.

\*\*\*\*\*

EXISTING SITE IP-0479 (Howes Pond)

Location: On Fish Brook about 200 feet upstream from Mill Street in Boxford, Mass.

South Groveland, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>6</u>	<u>10</u>	<u>8602</u>	<u>13.44</u>

Potential for Expansion: Significant expansion does not appear practical. Topography is not suited to a higher dam due to the lack of a high right abutment.

Remarks: The dam is an old granite block structure. A mill race is located on the left abutment. The spillway is a 20 foot wide overflow which drops into a rock lined channel. The dam is in poor condition.

Ownership and Use: The dam is owned by Owen Evans. The shoreline is owned by several individual homeowners. The site is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0480 (Towne Pond)

Location: On an unnamed tributary to Fish Brook about 500 feet downstream from the Boxford-North Andover town line in Boxford, Mass.

South Groveland, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>18</u>	<u>6</u>	<u>165</u>	<u>0.25</u>

Potential for Expansion: Significant expansion does not appear practical. Extensive diking around all sides of the pool would be required. The small drainage area limits the expansion potential.

Remarks: The dam is an earth-fill structure. The spillway is an aluminum riser and conduit. Erosion is taking place on the dam. The dam is in need of maintenance and has no emergency spillway.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources and two private owners. The site is used as a wildlife sanctuary.

\*\*\*\*\*



EXISTING SITE IP-0481 (Stiles Pond)

Location: On an unnamed tributary to Fish Brook about 2500 feet upstream from Main Street in Boxford, Mass.

South Groveland, Mass. USGS quadrangle  
Map Sheet 2

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>64</u>	<u>8</u>	<u>542</u>	<u>0.84</u>

Potential for Expansion: Significant expansion does not appear practical. About 30 cottages line the shore. The small drainage area limits expansion potential.

Remarks: The dam is an earth-fill structure with stone retaining walls on both slopes. The spillway is a 4-foot concrete and stone drop structure. Concrete in the spillway is cracked. Erosion is occurring on the downstream slope adjacent to the spillway.

Ownership and Use: The dam is owned by the Harry Cole Estate. The shoreline is owned by several youth camps and several cottage owners. The site is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0482 (Rantoul Pond, Clark Pond)

Location: On an unnamed tributary to Treadwell Creek and Ipswich Bay at Labor In Vain Road in Ipswich, Mass.

Ipswich, Mass USGS quadrangle  
Map Sheet 3

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>37</u>	<u>10</u>	<u>101</u>	<u>0.15</u>

Potential for Expansion: Significant expansion does not appear practical. The small drainage area limits expansion potential. The dam would be subject to tidal effects.

Remarks: The dam is an earth-fill structure with Labor In Vain Road across the top. The spillway is a concrete riser with flashboards and a concrete pipe conduit. Large trees are growing on the dam.

Ownership and Use: Ownership is not known. The site is used as a wildlife sanctuary.

\*\*\*\*\*

EXISTING SITE IP-0483 (Lowe Pond)

Location: On Pye Brook about 200 feet upstream from Depot Road in Boxford, Mass.

Georgetown, Mass. USGS quadrangle  
Map Sheet 3

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>26</u>	<u>4</u>	<u>2048</u>	<u>3.19</u>

Potential for Expansion: It appears that the pool level could be raised by 10 feet. Surface area would be nearly tripled. About 10 cottages would be affected. Sand and gravel in abutments may cause excessive seepage losses.

Remarks: The dam is a concrete weir structure with provision for flash-boards. The weir is 12 feet long. Structure is in good condition.

Ownership and Use: The dam is owned by Charles Killem. The pond is owned by shoreline property owners as members of Lowe Pond Associates. The site is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0484 (Hood Pond)

Location: On an unnamed tributary to Pye Brook about 300 feet upstream from Route 97 (Haverhill Street) in Topsfield, Mass. Two-thirds of the reservoir is in Ipswich, Mass.

Georgetown, Mass. USGS quadrangle  
Map Sheet 3

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>64</u>	<u>5</u>	<u>1232</u>	<u>1.92</u>

Potential for Expansion: It appears that the pool area could be raised by 10 feet. Surface area would be doubled. About 20 cottages, Boxford Road, and Linebrook Road would be affected.

Remarks: The dam is an earth-fill structure with a road across the top. This may be a natural pond. Spillway is a 30" corrugated metal pipe with a 3'x3' stone box culvert at the outlet.

Ownership and Use: The site is owned by the Massachusetts Department of Natural Resources and several shoreline cottage owners. The site is used for recreation.

\*\*\*\*\*

EXISTING SITE IP-0485 (Putnamville Reservoir)

Location: On an unnamed tributary to Wenham Swamp and the Ipswich River about 300 feet upstream from Locust Street in Danvers, Mass.

Salem, Mass. USGS quadrangle  
Map Sheet 3

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>266</u>	<u>25</u>	<u>533</u>	<u>0.83</u>

Potential for Expansion: It appears that the pool level could be raised 5-10 feet. Surface area would not be significantly increased. Expansion would appear to require diversion of water from outside the site drainage area.

Remarks: The dam is an earth-fill structure. The spillway is a concrete side-channel structure with a 30 foot long entrance weir. The dam and spillway are in good condition.

Ownership and Use: The site is owned by the Beverly-Salem Water Board and is used as a water supply reservoir.

\*\*\*\*\*

EXISTING SITE IP-0486 (Wenham Lake)

Location: On an unnamed tributary to the Miles River at Main Street in Wenham, Mass. Half of the reservoir is in Beverly, Mass.

Salem, Mass. USGS quadrangle  
Map Sheet 3

Surface Area (Acres)	Drainage Area (Acres)	(Sq. Mi.)
<u>220</u>	<u>1506</u>	<u>2.35</u>

Potential for Expansion: It appears that the pool could be raised 5-10 feet. Surface area would increase to over 300 acres. Few facilities would be affected. Expansion would appear to require diversion of water from outside the site drainage area.

Remarks: The dam is an earth-fill structure with Route 1A across the top. This may be a natural pond. The spillway is a 6'x3' stone box-culvert under Route 1A.

Ownership and Use: The site is owned by the Beverly-Salem Water Board and is used as a water supply reservoir.

\*\*\*\*\*



EXISTING SITE IP-0487 (Longham Reservoir)

Location: On the Miles River at the Beverly-Wenham town line in Wenham, Mass.

Marblehead North, Mass. USGS quadrangle  
Map Sheet 3

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>37</u>	<u>10</u>	<u>367</u>	<u>0.57</u>

Potential for Expansion: It appears that the pool could be raised 5-10 feet. Four roads would be affected. Surface area would be more than tripled. Expansion would appear to require diversion of water from outside the drainage area. Sand and gravel in abutments may cause seepage losses.

Remarks: The dam is an earth-fill structure. The spillway is a 10-foot long concrete weir with flashboards. Seepage was noted at the downstream toe of the dam. Trees are growing on the dam. The dam and spillway are in fair to poor condition.

Ownership and Use: The site is owned by the Beverly-Salem Water Board and is used as a water supply reservoir.

\*\*\*\*\*

EXISTING SITE -0488 (Mill Pond)

Location: On Maple Meadow Brook at Winter Street (Woburn). Reservoir is mostly in Burlington, Mass.

Wilmington, Mass. USGS quadrangle  
Map Sheet 1

Surface Area (Acres)	Height of Dam (Ft.)	Drainage Area (Acres)	(Sq. Mi.)
<u>65</u>	<u>47</u>	<u>404</u>	<u>0.63</u>

Potential for Expansion: Expansion potential is limited by a housing development on the south shore of the reservoir area.

Remarks: The dam is an earth-fill structure with a concrete core.

Ownership and Use: The site is owned by the Town of Burlington and is used for water storage.

\*\*\*\*\*



IP-0444  
Norwood Pond



IP-0463  
Brackett Pond



IP-0462  
Field Pond



IP-0464  
Collins Pond









IP-0465  
Middleton Pond



IP-0470  
Bradford Pond



IP-0469  
Eisenhoures Pond



IP-0471  
Salem Pond

EXISTING RESERVOIRS  
IPSWICH STUDY AREA







IP-0472  
Stearns Pond



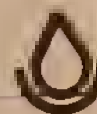
IP-0475  
Elginwood Pond



IP-0474  
Frye Pond



IP-0477  
Creighton Pond









IP-0478  
Farnum Pond



IP-0480  
Towne Pond



IP-0479  
Howee Pond



IP-0481  
Stiles Pond









IP-0482  
Rantoul Pond, Clark Pond



IP-0485  
Putnamville Reservoir



IP-0483  
Lowe Pond



IP-0487  
Longham Reservoir







# LEGEND

--- SUBWATERSHED BOUNDARY

○ STRUCTURE DRAINAGE AREA

○ POTENTIAL SITE

[0400]

POTENTIAL SITE

(IDENTIFIED IN 1965 STUDY, BUT NOT  
MEETING CURRENT INVENTORY  
CRITERIA)

[0400]

EXISTING RESERVOIR

[0400]



MATCH SHEET 2 OF 3



MATCH SHEET 2 OF 3

MATCH SHEET  
2 OF 3

IPSWICH RIVER (IP-04)

MASSACHUSETTS

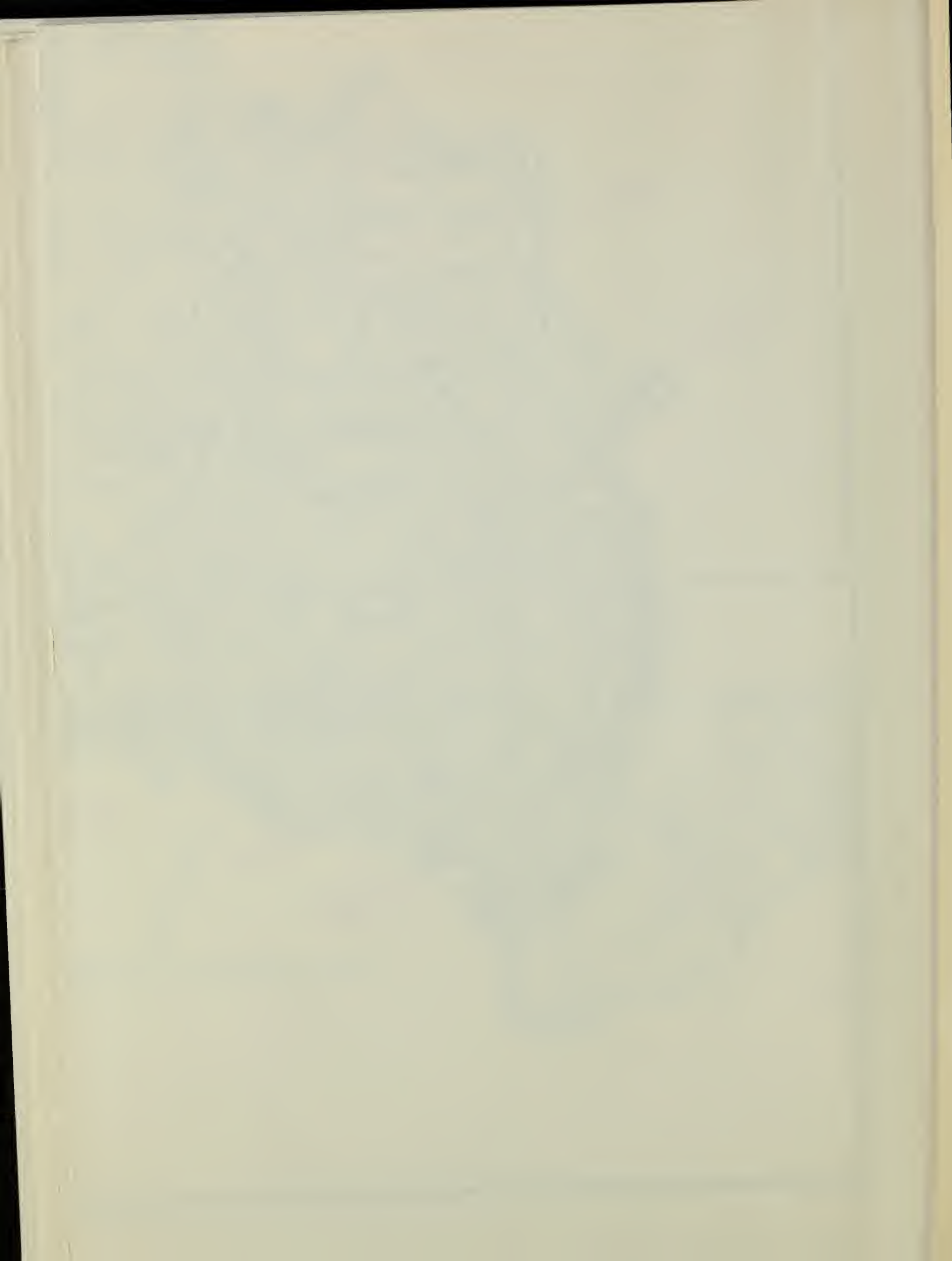
EXISTING AND POTENTIAL RESERVOIR SITES

UNITED STATES DEPARTMENT OF AGRICULTURE

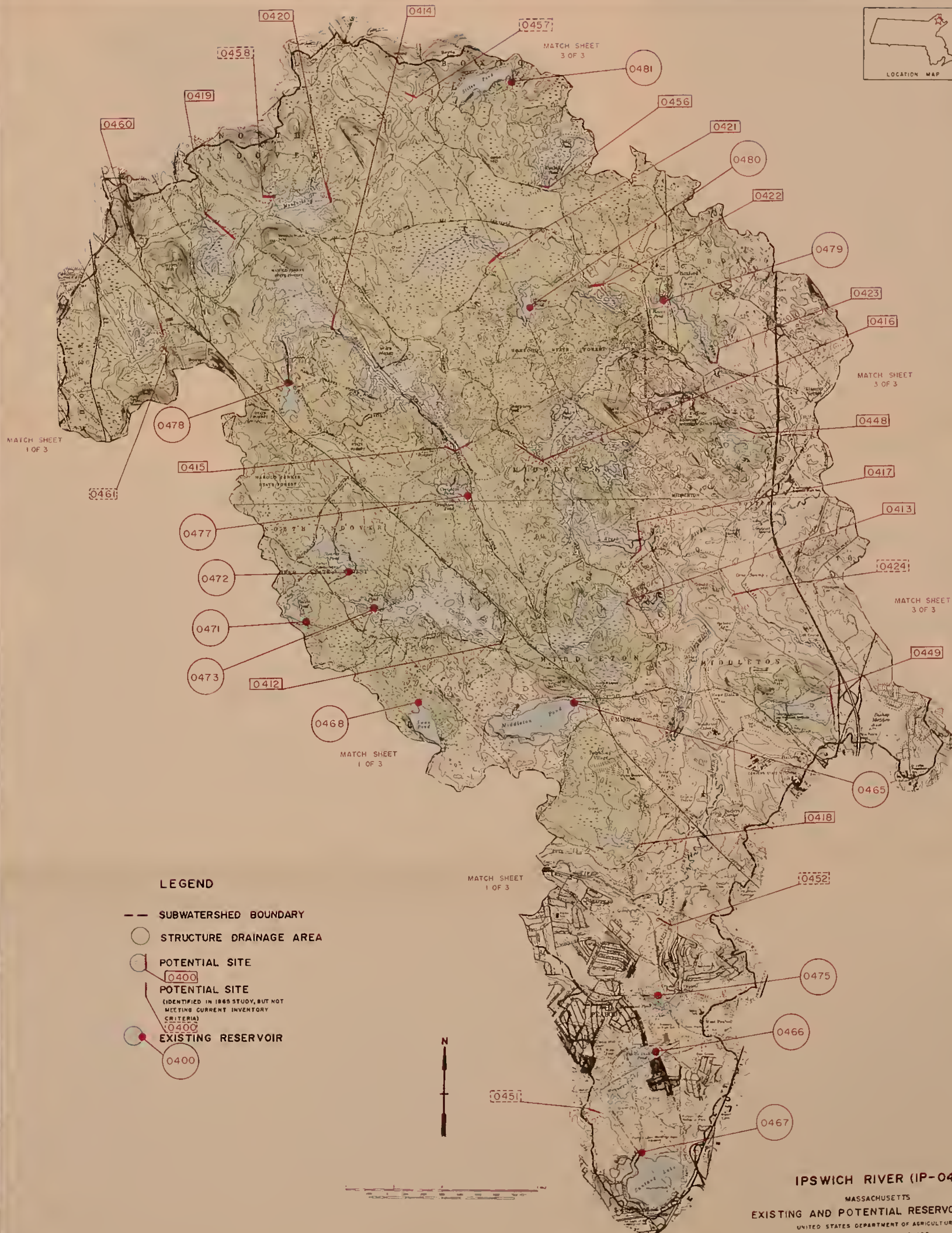
SOIL CONSERVATION SERVICE

SHEET 1 OF 3

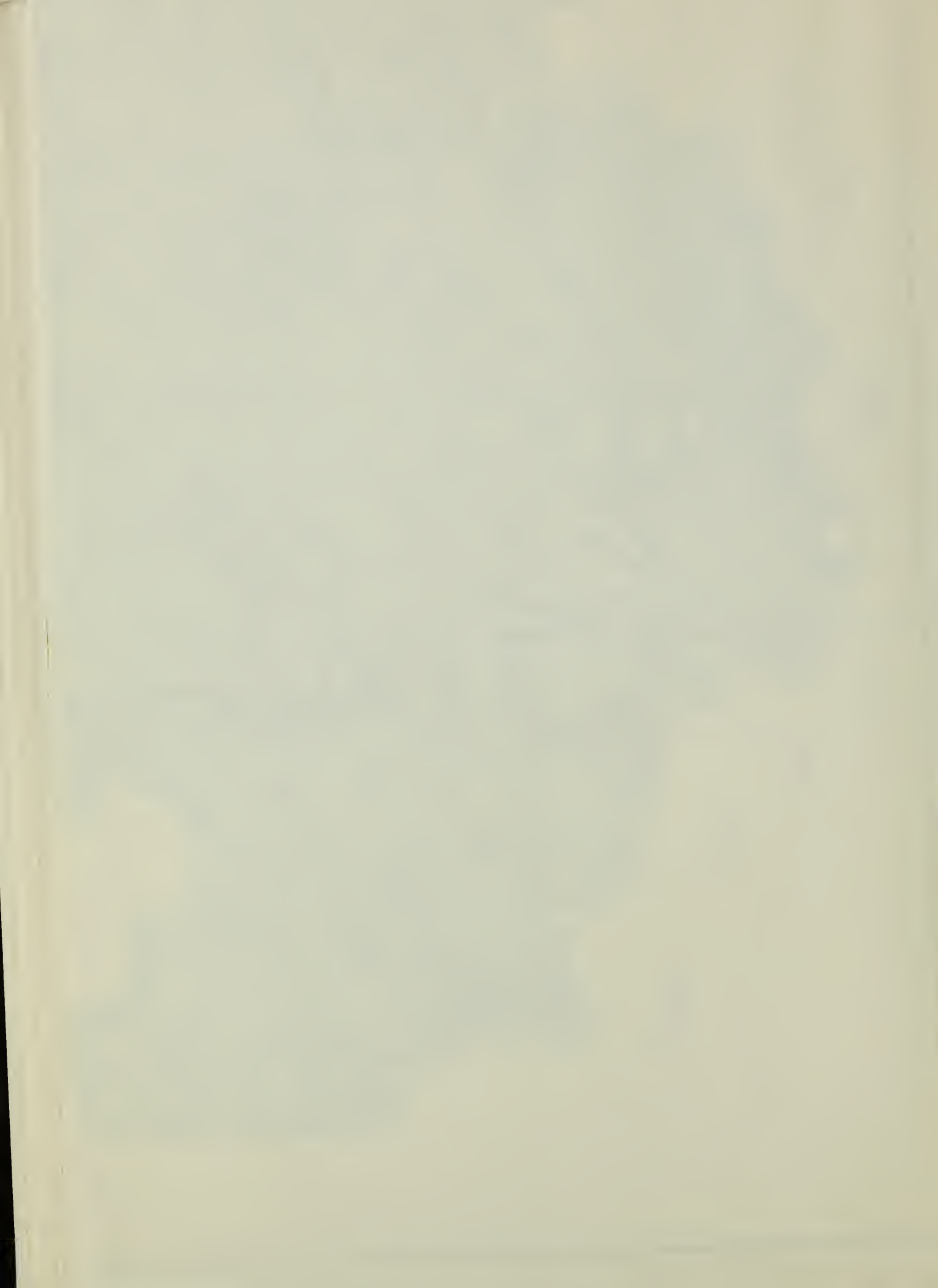


















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	0462	55	-
	0463	55	-
	0464	56	-
	0474	61	-
Beverly	0443	35	-
	0444	44	-
	0486	67	-
Boxford	0422	22	49
	0423	23	49
	0425	24	49
	0426	24	-
	0448	37	52
	0456	41	54
	0457	42	-
	0479	64	-
	0480	64	-
	0481	65	-
	0483	66	-
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APPENDIX

This report is one of a series dealing with reservoir sites. Previous reports in the series are:

1. Study of Possible Water Storage Areas, Ipswich River Watershed, January 14, 1965.
2. Study of Possible Water Storage Sites, Upper Hoosic River and Upper Housatonic River, February 1966.
3. A Study of Potential Reservoir Sites in Massachusetts, Hudson River Basin, January 1968.
4. A Study of Potential Reservoir Sites, Housatonic Study Area, Massachusetts, June 1969.
5. Inventory of Potential and Existing Reservoir Sites, Merrimack Study Area, Massachusetts, March 1970.
6. Inventory of Potential Reservoir Sites, Neponset Study Area, Massachusetts, October 1970.
7. Inventory of Potential and Existing Upstream Reservoir Sites, Thames Study Area, Massachusetts, January 1971.
8. Inventory of Potential and Existing Upstream Reservoir Sites, Parker and North Shore Study Area, Massachusetts, June 1971.
9. Inventory of Potential and Existing Upstream Reservoir Sites, Nashua Study Area, Massachusetts, March 1972.
10. Inventory of Potential and Existing Upstream Reservoir Sites, Deerfield Study Area, Massachusetts, November 1972.
11. Inventory of Potential and Existing Upstream Reservoir Sites, Chicopee Study Area, Massachusetts, May 1973.
12. Inventory of Potential and Existing Upstream Reservoir Sites, Taunton and Narragansett Bay Study Areas, Massachusetts, January 1974.

Reports will be prepared in future years for the remainder of the state. Basic data from which this report was prepared are on file in the Soil Conservation Service Office, 29 Cottage Street, Amherst, Massachusetts 01002.





# RIVER BASIN STUDY AREAS

## LEGEND

- Study Area Boundary
- Watershed Boundary and Number

## MASSACHUSETTS WATER RESOURCES STUDY MASSACHUSETTS

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE









